



# The 17<sup>th</sup> AASVET International Conference in 2021

Trends of Work Education and Training  
in the Post-Pandemic Era



## Symposium Proceedings- The e-papers

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# **Comparative Analysis on Green Skills Framework for Sustainable Development**

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## **ABSTRACT**

The Green Technology or clean technology is the application of one or more of environmental science, green chemistry, environmental monitoring and electronic devices to monitor, model and conserve the natural environment and resources, and to curb the negative impacts of human involvement.

Although Green Technologies have been adopted for Sustainable Development into organizations in the construction and energy sector, identifying and developing a comprehensive green skills framework for skilled workers and educators in green sectors to achieve sustainability has not been sufficiently tackled to this date. This literature review study presents a comprehensive comparative analysis and gives an insight into existing green skills frameworks to transform skills development for sustainable development. Moreover, to make this comparative analysis more in-depth, a matrix on existing green frameworks in chronological order is presented. This matrix presents the main conceptual models on greening Technical Vocational Education and Training (TVET) institutions to support green technology industry requirements with the support of the TVET sector. Despite this, the key characteristics of the existing frameworks also discussed and stated. Furthermore, the proposed matrix encourages TVET stakeholders and green industries to work together to produce skilled workers in green sectors. In addition to this, another matrix on the empirical research on Green Skills/Technology is depicted which provides several evidences on the workplace skills most relevant in the transition toward environmentally sustainable economies. These empirical research articles fulfill the demand of the training providers, green sector organisations, industry associations and unions etc. The purpose of the matrixes is to compare the existing work done by the different researchers on green skills.

**KEY WORDS:** Green Technology, Green Skills, Green Skills Framework, Green Matrix

## INTRODUCTION

Now a day, there are many discussions of green generation, green economy, green homes, green jobs and all things related to the phrase green. Though what does green really mean? Green can be an element that is described as a natural occurrence such as trees and forest, life, stability, peace and natural. Clearly there is no precise description to describe the concept of green skills. However, the definition of green skills from the viewpoint of researchers for this experiment is a concept that emphasizes on environmental element in lives and how individuals that will be produced can ensure a preserved development through economy, community and country. Green skills are professional and vocational skills, generic skills (sustainability approaches, problem solving, innovation) where green skills are needed in all industrial sectors as a response towards climate change and sustainable imperatives (DoE, n.d). Green jobs mean “green collared jobs”, which are individuals who contribute towards a better environment or to increase sustainability (ACF, 2021).

The Council of Australian Governments (COAG, 2008) stated that green skills is a form of skills that is on the path towards a sustainable preserved development from a technical aspect, value and attitude knowledge. All these skills are needed in the work force to develop and support the social, economical and environmental outcome that is established in business, industry and community. (Pavlova, 2011) has also listed down a few elements of green skills (see below table):

S.No	Green Skills defined by (Pavlova, 2011)
1	Environmental awareness, attitude and readiness to study about sustainable development, issues as well as challenges.
2	Innovation skills to identify chances and create new strategies to respond towards green challenges.
3	coordination and management of holistically approached skills towards the designated solution to fulfill economical, social and ecological objectives.
4	Entrepreneurship skills to grab the chance from low carbon technology
5	Analytical thinking skills: As a business and industrial step towards a model that is truly sustainable, there will be a need to understand the logic behind a rapid growing economy and how this is different from traditional model linear economic development.
6	STEM skills: general knowledge about the role of science, technology, engineering and mathematics to contribute to the process of a greener economy and community.

Green skills are deeply needed by all sectors no matter in the education sector, construction, industry and in all levels of workforce. While (Vona et al, 2015) in their research found out that green skills is a set from the efficiency that is related to design, output, management and technology monitoring. In the research findings, they discovered that the rules of the environment sparked a change in technology and organization that increases the demand for a higher analytical and technical skills.

This research reviews the relevant literature on Green Skills, existing frameworks on green skills especially in construction and energy sectors for skilled workers. This investigates green skilled framework among TVET educators and green industry stakeholders. The paper provides previous studies related to the topic of the study namely green skills framework in education and training sector. The old research and studies are important to show the knowledge gap in the literature. Moreover, the objective of the paper is to compare and contrast the literature pertaining to Green Skills framework.

## **GREEN SKILLS FOR RENEWABLE ENERGY SECTOR**

The economic movement towards a green economy creates opportunities for technology, investment, and new jobs. At the same time, environmental changes and especially climate change have a detrimental effect on specific economic sectors and can cause loss of some jobs. Lack of professionals with cutting-edge skills in energy efficiency, green engineering, and green construction have been identified in some countries as the main obstacles in implementing national strategies to reduce greenhouse gas emissions or address environmental change.

In the energy sector, rapid growth in renewable energy, progress in energy efficiency and better access to energy can lead to major gains in employment opportunities and income as well as significant environmental benefits. Fossil energy generation is likely to see job losses, calling for policies to ensure a just transition for workers and their communities (ILO, 2015).

The challenge of involving the private sector is particularly important in the energy sector, particularly in Africa. Only 30% of the African population have access to electricity, 80% rely on the use of biomass for cooking (mainly firewood and coal), 600,000 children die each year from indoor smoke pollution. Still, by 2014, Africa attracted less than 10% of global investment in renewable energy (about 80 billion USD) despite a significant potential (AFD, 2017).

(L. Energy, 2021) stated that different types of green sector jobs required different types of skills that are in demand of the industry. Although there are many skills that are important for this type of work, the five below are those that will give you the edge over other candidates.

- Technical Skills
- An Inquiring Mind
- Ingenuity
- Communication
- Motivation

## **GREEN SKILLS FOR CONSTRUCTION SECTORS**

The construction sector is responsible for one-third of all global carbon emissions and one-third of global resource consumption. Curtailing the environmental impact of this sector is, therefore, an urgent task for ensuring the survival of future generations. One of the major challenges in greening the construction sector is that as an industry, it is fragmented and disjointed. A single construction project can involve hundreds or even thousands of different organizations in a supply chain.

The construction supply chain is highly complex diverse, and fragmented. On a large construction project, the number of organizations involved in the supply chain can run into the thousands.

- Green building design
- Green purchasing
- Green Transportation
- Green Construction/Manufacturing
- End of life Management

The term sustainable or green supply chain refers to the idea of integrating sustainable environmental processes into the traditional supply chain. This can include processes such as supplier selection and purchasing material, product design, product manufacturing and assembling, distribution and end-of-life management. Instead of mitigating harmful impact of business and supply chain operations, green supply chain involves value addition and/or value creation through the operations of whole chain.

## **RELATED EXISTING FRAMEWORKS AND RESEARCH**

Industry is striving to support economy through green economy. The Green economy is very complex construction regarding efforts to integrate economic, environmental, and social problem, which involve various figures and forms of government needed to regulate the process of green environment. Furthermore, among the conceivable areas where these creations and growth are expected to come from involve organic farming, green energy, green building construction, eco-textiles, and manufacturing of relevant products and materials to support green business because it is new to the industries (Abolfazal et al, 2017). The following section will help to understand the existing frameworks and their contribution towards green technologies and skills.

### **Skills Framework for Environment – Singapore**

The Skills Framework is a SkillsFuture initiative developed for the Singapore workforce to promote skills mastery and lifelong learning, and is an integral component of the Environmental Services Industry Manpower Plan (SFS, 2020).

This framework was jointly developed by SkillsFuture Singapore (SSG), Workforce Singapore (WSG), and the National Environment Agency (NEA), together with industry associations, training providers, organisations and unions, the Skills Framework for Environmental Services provides useful information on:

- Sector information;
- Career pathways;
- Occupations and job roles;
- Existing and emerging skills; and
- Training programmes for skills upgrading and mastery.

This framework addresses the needs of the individual (students, researcher etc), employers, and training providers. It is systematic framework which contains information on trends, career pathways, occupations, job roles, skills and competencies and training programmes. This framework more focused on environmental services instead of specific sector such as Energy and construction sectors.

### **Greening TVET Framework – Majumdar**

The focus of Greening TVET framework is to transform TVET institutions into becoming green. It is a proposed international framework for TVET organization to transform TVET institutions. (Majumdar, 2010) elaborate a three-tier approach, consisting 1) development of a framework to transform and orient TVET institutions into becoming „green“, 2) support transformation through a national-level Green Policy; and 3) develop an international cooperation model that support formation of a network of green-bound institutions. It also defied five dimensions:

- **Green campus**
- **Green technology**
- **Green community**
- **Green culture**

The author focuses on thematically oriented suggestions for actions towards greening TVET. In this paper, no detailed analysis is present which can help to understand the overall greening practices in TVET institutions. Since Majumdar’s proposal for greening TVET institutions is being spread all over the world by UNESCO-UNEVOC, it seems to be worthwhile to discuss the approach and get the idea for perfect green skills framework for future skilled workers.

### **An ESD Pedagogical Model – Pavlova**

It is an interesting paper which abstracted an education for sustainable development (ESD) pedagogical model relevant for the TVET context based on the pilot study and literature review (Pavlova, 2019). This study explores and identified the differences between pedagogical approaches used in TVET to teach SD issues and approaches suggested in the literature

(although they are proposed for universities and other education institutions). Furthermore, this paper advised how four elements of the framework can be translated

into learning objectives, pedagogical strategies and learning activities and which specific generic green skills can be addressed through the different components. The Problem-Oriented and Project-Based Learning Plus model (POPBL+) is proposed here to facilitate the effective delivery of the generic green module to enhance students' generic green skills. Bringing the world into the classroom is an important component of this model, as the current reality of the TVET institution involved in this study would not allow students to go outside campus during the module.

**Framework for Green Skills for Environment Industries – Pavlova**

This article proposed a green skills framework for environment industries based on analysis of trends in Hong Kong, China, India, and Malaysia. A detailed analysis report on existing government policies of these countries were discussed. The article also identified that development of these industries, resulting in new employment opportunities for young people and new skills requirements. Based on evidences, a holistic framework to support the development of road maps relevant to different contexts that extend beyond TVET to all levels of education, and which involves close partnerships between governments, industry, civil society, and education (Pavlova, 2019). The article presented a framework for green skills to help TVET meet the skills needs of environment industries.

**MATRIX ON EXISTING GREEN FRAMEWORK**

These framework/models of green skills represent the main conceptual models on greening TVET institutions to support green technology industry requirements with the support of the TVET sector. The key characteristics of these models are summarized in Table 5. These frameworks encourages TVET stakeholders and green industries to work together to produce skilled workers in green sectors.

*Table 2: Matrix on Green Frameworks - Chronological order*

Title of the work	Year Published	Authors	Characteristics
United Nations Decade of Education for Sustainable Development (an special framework)	2005	United Nations	The main aim to make sustainable development central to all education and training in all sectors by refining and promoting the transition to a sustainable future through all forms of education, public awareness and training.
Education as sustainability: An action research study of the burns	2009	Burns, H.	This model is comprised of five key dimensions: (1 )Content; (2)Perspectives; (3)Process;

model of sustainability pedagogy			(4)Context; and (5)Design.
International Framework for Greening TVET for Green Society : a three-tier approach	2010	Majumdar, S.	In visualizing a common framework, three tiers need to be established. 1. Transforming TVET Institutions 2. Formulating National Policies 3. Forming International Alliance
A strategy for green skills? A study on skill needs and training has wider lessons for successful transition to a green economy.	2012	CEDEFOP	A study on skill needs and training has wider lessons for successful transition to a green economy.
Facilitating the development of students' generic green skills in TVET: an ESD pedagogical model	2019	Pavlova, M. and Christy Shimin Chen	This paper considers pedagogy for education for sustainable development (ESD) as a broad framework that can enhance the development of generic green skills. It examines current theories and a selection of practices related to ESD pedagogy and analyses pedagogical approaches commonly used in ESD curricula.
Emerging environmental industries: impact on required skills and TVET systems	2019	Pavlova, M.	This article analyzes recent trends in Hong Kong, China; India; and Malaysia where government policies in the last two decades have paved the way for the rapid development of these industries, resulting in new employment opportunities for young people and new skills requirements. It suggests an evidence-based, holistic framework to support the development of road maps relevant to different contexts that extend beyond TVET to all levels of education, and which involves close partnerships between governments, industry, civil society, and education.
Skills Framework for Environmental Services	2020	SkillsFuture, Singapore	The Skills Framework is a SkillsFuture initiative developed for the Singapore workforce to promote skills mastery and lifelong learning, and is an integral component of the Environmental Services Industry Manpower Plan.

## MATRIX ON THE EMPIRICAL RESEARCH ON GREEN SKILLS/ TECHNOLOGY

These empirical researches provided several evidences on the workplace skills most relevant in the transition toward environmentally sustainable economies. These articles fulfill the demand of the training providers, organisations, industry associations and unions etc. The key summaries of these researches are depicted in Table 3.

Table 3: Matrix on on the Empirical Research on Green Skills/Technology

Title of the work	Year Published	Authors	Characteristics
The status of environment education in the Mediterranean countries within formal and informal education system.	2004	Perikleous, E.	The education on the importance of the environment is essential to increase the level of individuals' self-awareness. Environmental education has the potential to assist the future generation to manage life and to establish a prosperous future.
<b>Assessing knowledge, attitudes, and behavior toward charismatic megafauna: The case of dolphins.</b>	2005	Erin C. Barney, Joel J. Mintzes, and Chiung-Fen Yen	It is a cross-age study which assessed public knowledge, attitudes, and behaviors toward bottlenose dolphins.
<b>Environmental management and environmental education in two schools in the Klang Valley</b>	2005	Lim, S.F.	The study explored Environmental management and education into two school of Malaysia.
Factors Associated With K–12 Teachers' Use of Environment-Based Education. The Journal of Environmental Education	2007	Julie Ernst	The author used analysis of variance and discriminant function analyses, and results suggest that environmental literacy knowledge and skills and environmental sensitivity are important in teachers' decisions to

			use and their abilities to implement environment-based education.
<b>Impact of Global Recession on Sustainable Development and Poverty Linkages</b>	2010	ADB	Paper discusses consequences of global financial crisis for energy use, pollution prevention, and land use in Asia and associated greenhouse gas emissions and their linkage with poverty.
<b>Skills for green jobs: A global view</b>	2011		
<b>Skills for a Green Economy: Practice, Possibilities, and Prospects</b>	2013	John Fien and Jose Roberto Guevara	Achievement of ‘green economy’ will require existing education and vocational training systems to be capable of equipping future workers with the requisite breadth of competencies needed to take full advantage of the employment opportunities being generated by the ‘green economy’.
<b>Green and sustainable development for TVET in Asia</b>	2016	Ramlee Mustapha	The aim of this paper is to map the sustainable development in terms of green mindset, lifestyle, economy, education, training, employability and sustainability in selected Asian countries.
<b>Informal And Formal Environmental Education Infusion: Actions of Malaysian Teachers and Parents Among Students in a Polluted Area</b>	2017	Baniah Mustam, Esther Sarojini DANIEL	The study explored Environmental Education infusion among students by teachers and parents in two schools located in a highly polluted area.
<b>Exploring green skills: a study on the implementation of green skills among secondary school students</b>	2018	A. Kamis, R. Rus, Mohd Bekri Rahim, F. Yunus, Normah Zakaria, H. M. Affandi	The aim of this research is to explore the views of teachers regarding the instilling of green skills in students and the types of green skills applicable in schools. This research is a qualitative investigation using the method of in-depth interview to collect information from the teachers who handle the subject of Living Skill Integration in secondary

			schools.
<b>Awareness of green technology among engineering technology students</b>	2019	Ramlee Mustapha, Irdyanti Mat Nashir, & Nurul Nazirah, Mohd Imam Ma'arof	The purpose of the research is to find out the green awareness among engineering technology students. The study found that even though the majority of the respondents claim that their awareness of green technology is relatively high, the daily application of green technology in their lives is only moderate.
<b>Development of Secondary School Students' Green Skills for Sustainable Development</b>	2020	Sarsvathy Thirupathy, R. Mustapha	This concept paper discusses about the implementation of green skills in the learning process for secondary school students. Activities which contribute toward the preservation of the environment and the conservation of energy are considered as part of generic green skills.
<b>A Structural Model of Green Technology Practices among Primary School Teachers at Northern Region Malaysia</b>	2021	Talirkodi Vinathan and Arumugam Raman2	This study aimed to examine the level and influence of primary school teachers' awareness and motivation in accepting green technology practices. Besides, this study aimed to examine the moderation effect of knowledge and gender on the relationship between awareness and motivation with the acceptance of green technology practices.

## CONCLUSION

The paper discusses about the frameworks, models, and empirical researches related to green skills and technologies. The overall purpose of paper is to do the literature review on existing research. There are two green sector are focused in this study i.e. energy and construction. Furthermore, the researcher also explains the concept of green skills and sustainable development. In addition to this green skills related to proposed sectors are explained. Based on international studies there are different green skills framework described and write a narration on these. Two matrixes are also prepared and developed on green skills framework and empirical research on green skills & technology. The purpose of the matrixes is to compare the existing work done by different researcher on green skills.

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# **The Current Status and Dilemma of Informal Sector Workers (ISWs) and Its Policy Implications in Uganda**

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## **Abstract**

Informal sector is an inevitable phenomenon in both developed and developing economies capturing attention of many policymakers and governments. Its contribution to economic growth agendas of many developing countries such as Uganda is ineligible as a low developed country with a small formal sector inefficient to absorb all its labor force. The purpose of this paper is to explore the status, dilemma, and policy implications to improve the performance of ISWs in Uganda. A qualitative research approach with documentary analysis of secondary data obtained from national and international databases were complemented with journal articles on informal sector in developing countries with a particular focus on Uganda. Four criteria were used to select appropriate articles for inclusion in this study; (i) focus on origin and operation of the informal sector, (ii) linked informal sector with skill training, (iii) published in the English language, and (iv) fully accessible and downloadable article. Through PRISMA framework, a total of 45 articles were downloaded at level 1. At level 2, after reading article titles and abstracts, 19 articles were excluded for duplication (n=10) and no clear connection with IS and ISWs (n=9). Finally, 10 articles were retained for re-reading and analysis with the guidance of study research questions because they met all criteria for inclusion. Content data analysis technique was used to analyze qualitative data. The study findings indicate that informal sector definition is complex whereby even in Uganda, it was defined based on its characteristics such as unregistered and untaxed businesses, employees' size, insecure employment, low productivity, limited training, use of low technology. The sector provides over 70% of nonfarm employment opportunities to those who can't secure better job opportunities in the formal economy. Also, it was found that ISWs were categorized into three groups such as those dealing in light manufacturing and agro-processing, trade, and service workers. Furthermore, the dilemma of ISWs was similar such as lack of legal and social protection from the state authorities, inadequate access to financial credits and facilities, poor infrastructure and working conditions, inadequate use of technology that hinder their productivity. Study implication pointed

on regulatory policies such as skill training, ISWs social protection, and easing business formalization process as possible solutions towards addressing the challenges of ISWs to improve their productivity were discussed in this paper.

Keywords: informal sector workers, informality, informal sector challenges, skill training, developing countries

## 1. Introduction

The informal sector is a common phenomenon in economies as more than 61% of world's population earn a living in this sector or economy globally (ILO, 2018). Specifically, it is rampant in many Sub-Saharan African countries employing over 70% of the population in micro small and household enterprises outside formal employment. Besides agriculture, informal sector plays a great role as a major source of employment, poverty alleviation and improving earnings for rapidly growing populations vis-a vis the small size of formal sector. Therefore, improving the productivity of the nonfarm informal sector is essential for employment, income growth, and poverty alleviation in the region.

Many challenges affect its productivity for example, access to finance, infrastructure, and an investor-friendly business climate, low levels of human capital lack of relevant skills to the labor market. Thus, this paper seeks to explore the status of informal sector and the dilemma of informal sector workers in Uganda, to draw policy implications. The study was guided by following research questions: (i) What is the status of the informal sector in Uganda? (ii) What dilemma (challenges) do ISWs experience in Uganda? (iii) What are the possible solutions to these difficulties faced by ISWs in Uganda?

## 2.0. Research Methodology

This study employed a qualitative approach (John Creswell, 2014) with a documentary analysis of secondary data on the informal sector (IS) and its workers in Ugandan to give an overview description of IS operation and organization and the dilemma of IS workers in Uganda. This study used analyzed archived documents, statistical reports/briefs, newspapers, and articles on IS policies and strategies, challenges and possible solutions got from national and international databases complemented by relevant journal articles obtained via online Google search engines.

The following criteria were used for articles included in the study (i) focus on informal sector operations, (ii) linked informal sector with skill training, (iii) published in the English language, and (iv) fully accessible and downloadable articles. A total of 45 articles were downloaded at level one (search by keywords), at level two (reading titles and abstracts), 16 articles were excluded for being duplicate and 29 articles were

retained for re-reading and analysis in line with research questions because they met all the above criteria of inclusion. The content analysis method was used to organize data information into codes and categories related to the central questions of the research.

### **3.0. Results and Discussion**

#### **3.1. Status of Informal Sector (IS) in Uganda**

Presently, many regions and countries globally continue to experience the rapid growth of informal economies to provide employment alternatives to thousands of unemployed youths, women, and the poor (Maligalig & Guerrero, 2015). The concept of informality exhibits the co-existence of "shadow" economies i.e., informal alongside formal economy or traditional vs. modern economy (Adams, de Silva & Razmara, 2013; Palmer, 2008; Debrah, 2007).

Informal Sector was first coined in 1970s during ILO Conference in which Comprehensive Employment Mission to Kenya presented a report identifying IS characteristics linked to unregistered, small household enterprises, tax avoidance prevalent in Kenya and Ghana (Adams, de Silva & Razmara, 2013). Since then, it became a global phenomenon for as a safety net to formal economy in job creation, providing income to thousands of people, especially marginalized groups like unemployed youths, women, and the poor. According to ILO, IS refers to all nonfarm unregistered or unincorporated enterprises operated for self-employment (work for their account) or occasionally employ contributing family members as wage employees (ILO, 2002).

Meanwhile, the Uganda Bureau of Statistics (UBOS) defines IS as unincorporated businesses or enterprises (individual or partnership) not registered for tax or lack complete books of accounts. Any establishment employing less than five people and not legally registered (UBOS, 2018). IS growth in Uganda is attributed to factors such as small size and inefficiency of formal and private sectors to absorb all labor force, unclear benefits of formalizing business, bureaucracy in transition from informal to formal, little finances required, and easy entry and exit in IS (Muwonge, Obwona & Nambwaayo, 2007).

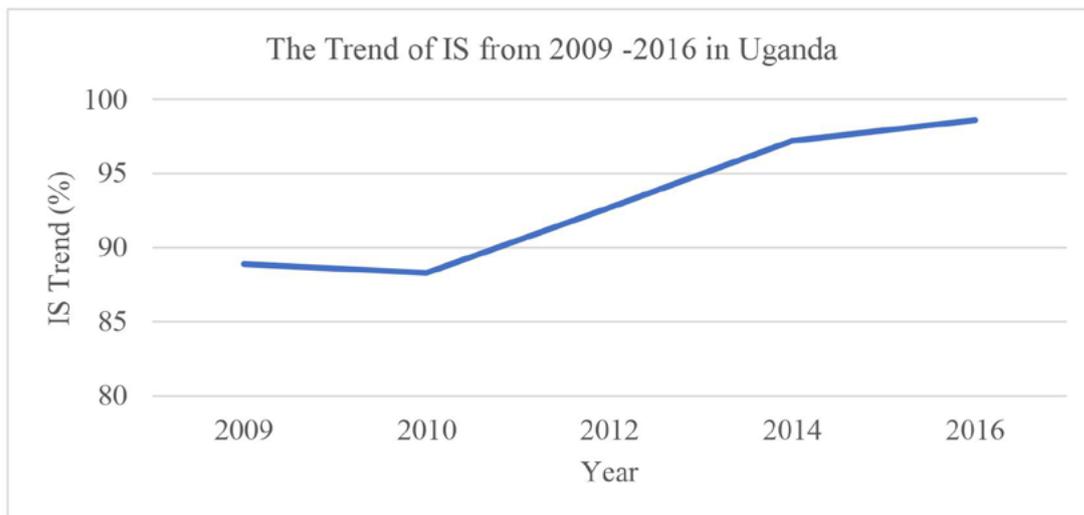
Thus, IS has the potential to influence Uganda's economic development through job creation, income generation, and poverty alleviation for both rural and urban dwellers, for example, it employs over 75% of Ugandan youths, women, school leavers, and rural migrants in Uganda. The common IS characteristics in Uganda included low labor productivity, limited training, use of local technology, limited access to credit and finance, small markets, lack of raw materials, inadequate power supply, low levels of skills and productivity, and lack of access to information and technology (MGLSD,

2011, Balloon n.d.)

It was also found that IS activities were categorized into three groups: (i) light manufacturing and agro-processing including food, textile, garments, perfumes and oils, fabrication, electronics, mills, chemicals, and machinery and equipment; (ii) services, includes restaurants, barber and salons, mechanics and repairs, radio repair, bicycle repair, transportation (like taxi drivers, motorcyclist) and shoe shiners, (iii) trade includes retail shops, produce, fish selling, eating kiosks, construction, information technology (I.T), art and crafts, flowers, and mobile money business (UBOS, 2018; Mugoda et al, 2020).

### 3.2. Informal Sector Workers (ISWs) in Uganda

Since there's no conclusive definition of Informal sector, the definition of IS workers refers to all individuals whose source of income and employment opportunities are generated through informal sector activities. In a study by Naik (2009), ISWs are "all individuals involved in all informal and household activities. In Uganda, ISWs comprise of own-account workers/self-employed, contributing family, and paid employees (e.g., household workers) without employment benefits (UBOS, 2018). In other words, IS workers face low pay and limited labor standard and legal protection. Such workers include waiters and waitresses, electricians, auto mechanists, carpenters, food vendors, hawkers, metal fabricators, taxi drivers, motorcyclists (bodaboda), hairdressers, and barbers, and all workers in all IS-related activities.

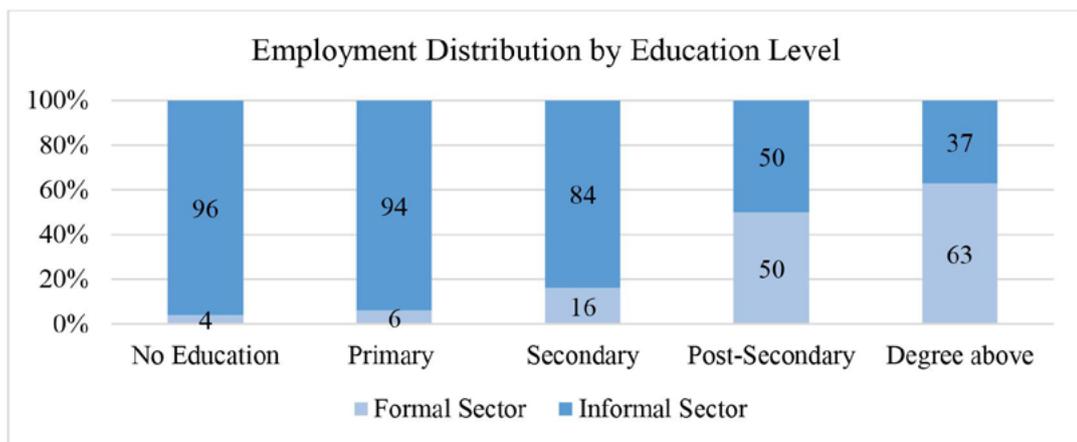


Source: Economic Policy Research Center (2017)

**Figure 1. The Trend of ISWs by Gender of Working Age population (14-64yrs) in Uganda**

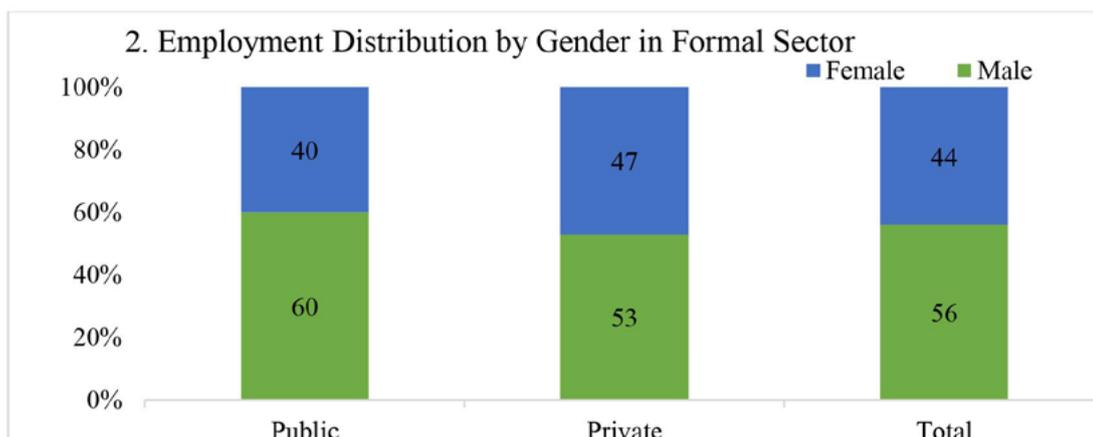
Figure 1 shows a study by Economic Policy Research Center whose findings revealed informal sector was so trendy in Uganda that there was more than 10 percent increase

up from 88.9% in 2009 to 98.6% in 2016 of population engaged in informal sector. This indicates that many Ugandans view informal sector as a potential game-changer for employment opportunities given difficulties and non-attractiveness in transition to the formal sector. It also indicates a compromise with the nation's potential and productive assets deemed for economic transformation into a developed economy. For example, majority of ISWs are people with low education attainment (see Figure 2 below) whose productivity can be enhanced through skills training and development turning them into potential semi and skilled workforce.



Source: UBOS, Manpower Survey Uganda/MAPU (2018)

**Figure 2. Employment Distribution by Education Level in Uganda**



Source: UBOS, Manpower Survey Uganda, 2018; UBOS, National Labor Force Survey, (2018)

**Figure 3. Employment Distribution by Gender in the formal sector**

Also, statistics in Figures 2&3 align with the Uganda Manpower Survey report 2016/17, which indicated that females and youth dominated the majority of ISWs as well as individuals with low educational attainment (UBOS, 2018; World Bank, 2020).

This finding is consistent with ILO, (2018) report that indicated that education level is a key factor for informality.

The dilemma that befalls ISWs in Uganda rotate around poor working conditions, e.g., poor work environments, hazardous work, working longer hours, etc., deserves attention to improve the productivity and efficiency of this sector for example, UBOS (2018) revealed that ISWs worked for at least ten (10) hours higher than eight (8) formal working hour, yet they receive low payment like casual workers, domestic / home care workers due to absence of minimum wage policy.

Furthermore, lack of legal protection of ISWs by the government and statutory authorities regarding work conditions, for example, lack of formal contracts, minimum wage, holiday leaves, and compensations in case of personal injuries caused by accidents while at workplaces. An unorganized form of IS activities, lack, or ISWs representative voice to advocate for rights and treatment enjoyed by formal sector workers is another reason to explain this problem (Ajok, 2016; Iyamuremye, 2019).

In addition, lack of access to social protection including social security, e.g., National Social Security Fund (NSSF), social insurance services for ISWs to protect them against high risks including loss of jobs, high mortality of business ventures hence becoming vulnerable groups in case of disaster occurrences. Finally, lack of access to financial credit institutions due to lack of collateral security to access commercial loans, and high-interest rates (18-21%) charged on those loans, inadequate financial literacy, and information accessible by ISWs limits expansion opportunities of IS businesses in Uganda. These findings concur with findings of ILO, 2018 summarizing social protection, rights at work and decent working conditions, and lack of access to finance as challenges for informal workers.

#### **4.0. Policy Implications**

Although the government of Uganda initiated Skilling Uganda program, demand-driven skill training targeting all categories of ISWs has been minimal. For example, skill training through Business Technical and Vocational Training (BTVET) centers continue to follow supply and not demand side of skills. Work-based training such as on-the-job training (OJT), just-in-time training (JIT) and apprenticeship should be emphasized. Trainings should target inclusion of business and managerial abilities, financial and information literacy to enable ISWs to easily manage their business operations with efficiency by help of emerging technologies. This will enable ISWs to gain more hands-on work experience and attitude from workplace experts and certification that can be used for training progression if needed. In Uganda, since few employers engage in skill training of their employees, it's even worse in informal sector due to their limited resources and incompetence.

Legal and Social protection ensures ISW's health and safety, promotion of rights as well as continuity of their business ventures with job security. For instance, to reduce worker's exploitation by selfish employers in IS, minimum wage policy and occupational safety and health standards should be setup by government to regulate working conditions of all workers in all sectors in the country. Similarly, in ensuring social protection policy of ISWs, social security policies like transfer grants, insurance services i.e., NSSF, social support care like setting up IS rehabilitation program to quickly respond to ISW's

challenges during uncertainties such as CoviD-19 pandemic. Also, government should ease IS transition process to formal sector by eliminating bureaucracy, transition duration, reduce registration cost, and corruption.

Another policy implication regards improving access to financial credits and its institutions especially establishment of microfinance institutions such as SACCOs. Also, the government should set a standard interest rate on loans offered by Savings and Credit Cooperatives (SACCOs) nationwide for effectiveness and will avoid every SACCO from overcharging ISWs.

#### **4.1. Conclusion**

Conclusively, the role of Informal Sector can't be underestimated in developing countries like Uganda due to its perceived roles. It provides employment opportunities to majority (over 75%) of marginalized groups in Uganda although its contribution to total GDP is low. The challenges of ISWs greatly hinder their efficiency and productivity deserving special attention to support to a large population. Government policies such as legal and social protection, easy access to financial credit create a relaxed and convenient environment for ISW's transition from informal to formal sector benefiting regulatory authorities in terms of widen tax base and better incomes.

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# **Difficulties and Countermeasures in the Implementation of Distance Education in Vocational Senior High School under COVID-19 Epidemic**

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## **Abstract**

In 2020, the COVID-19 epidemic swept the world and school education was almost forced to be interrupted. However, learning cannot be waited. It's so-called "suspension of classes not suspension of learning". According to this, schools at all levels have begun to implement various of teaching models. And distance teaching has become the first choice at all levels of schools.

Based on this context, this article uses: literature research, action research, and questionnaire surveys to explore the actual situation and difficulties of distance teaching in schools at all levels in Taiwan. In response to the major change of teaching and learning models.

According to the epidemic trend, this article explores the mechanism for schools to implement distance teaching and learning transformation. It also focuses on the technical high schools and analyzes their response strategies, including: the discussion of facing the difficulties and response strategies, providing reference model for distance teaching in the future and promoting the information technology application of integrated into teaching for the new curriculum, promoting the way of student self-learning model for relevant policy planning and fulfill teachers teaching as the effect of sustainable development.

**Keywords:** technical high school, distance education, suspension of classes not suspension of learning, COVID-19 epidemic, information technology

## **I. Introduction**

In 2020, the COVID-19 epidemic swept the world, and most schools in various countries were almost forced to interrupt physical teaching and activities (Viner, Russell, Croker, Packer, Ward, Stansfield, Bonell, & Booy, 2020). Based on learning cannot be waited, schools at all levels in Taiwan change into distance teaching. So the concept of “suspension of classes and no suspension of learning” is truly implemented. Although distance teaching can temporarily solve teaching problems and will not be restricted by time and teaching location (Ye Jianhong, 2019), there are still many supporting measures that need to be resolved and breakthrough.

## **2. Research purposes and methods**

### **(1) Research purpose**

The purpose is to study and explore the problems of technical high schools facing on the COVID-19 epidemic in the implementation and response of distance teaching, finding the accurate solutions, providing relevant policy formulations at all levels, and development the feasibility of distance teaching as a normal mode by the experience and reflections of distance teaching in schools led the author.

The technical high school mentioned in this article refers to a part of secondary education in Taiwan, which is classified as a technical and vocational education system. Generally known as senior vocational school, also referred to as higher vocational school.

### **(2) Research methods**

This study adopts literature research and collects the research literature of countries in response to the epidemic since 2020, including: the United Nations, action observation, actual records, and the meta-outcome questionnaire of "The dilemma and effectiveness survey of distance teaching at all levels schools ". To collect information, analyze and compare the research results, and focus on the domestic technology high schools under the concept of “suspension of classes and no suspension of learning”, to understand the promotion of distance teaching models and difficulties, including: the discussion of facing difficulties and solving strategies, providing future policy and carry out the consideration of distance teaching in schools.

## **3. Implementation status and dilemmas**

Distance teaching almost covers three modes: synchronous class (online live teaching); asynchronous teaching (video tape or pre-video tape teaching); PPT presentation teaching and quarantine and other electronic digital teaching materials (Ye Jianhong,

Ye Zhenni, 2020).

The questionnaire survey showed that more than 99% of the schools across the country implemented distance teaching activities using these three modes in the epidemic. This also reflects the suddenness of the epidemic and the schools lacks of preparation. Therefore, to solve the teaching needs immediately, the existing equipment is adopted first. This is the current status of implementation.

However, even if the ready-made model is used for distance teaching, there are difficulties it faced. According to the observation and research, the initial implementation of distance teaching schools does face many difficulties, including:

**(1)The dilemma of mentality:**

Facing the epidemic, both teachers and students in the early stage were conservative and flustered. The research has shown that 75.5% of teachers are not ready to implement distance teaching. 65% of teachers resist distance teaching and questioning the teaching. Teachers subjectively considered to be only a short transition period. Therefore, teachers, a wait-and-see approach to distance teaching, are account for about 65.7%. Teachers and students did not actively correspond to each other, resulting in teaching and learning preparation was insufficient.

**(2)Inequality of urban and rural resources:**

In response to the epidemic, the promotion of distance teaching has also revealed the disparity between urban and rural education resources. The survey shows that there is a disparity of 55.3% of the completeness between urban equipment and rural or rural areas. It shows that there are high disparities, including: insufficient equipment and network traffic in schools and homes, disparities in teachers, and the problem of teaching quality is affected by rural teachers who teach in cross-fields at the same time.

**(3)Course arrangements and practical problems.**

According to the survey, students have participated in distance teaching for a long time, 79.1% of students feel that their eyes are overburdened and the courses are over-loaded. 90.2% of students feel that in self-operation is hard because of their computer equipment is insufficient at home. 63.6% of teachers report that students in immediate learning of mastery are insufficient. 52.7% of students report that practical lessons are difficult to carry out, especially in technical high schools such as car repair and lathe.

**(4)Insufficient evaluation and interaction.**

Research shows that 67.9% of teachers said they could not understand the reaction of students in the learning process. It cause to the inability to assess the teaching results. 70.2% of students said they could not interact closely with teachers and could not clarify the learning key points. 85.5% of students doubted the fairness of online tests.

#### **(5)The dilemma of implementing simulation.**

Distance teaching has its convenience and unrestricted, but for the practical operation curriculum at school, it does have its barriers. Research shows that 68.9% of teachers report that students cannot completely understand the precise follow-up of technical implementation, even if the films are used to assist teaching. 78.2% of students said that the distance teaching courses lacked the sense of presence of operating a physical machine and could not completely understand the key point of technology.

#### **(6)Questions from parents.**

This dilemma is related to school equipment and social-economic status of family. If a family has lots of children in school and only one set of computer equipment could cause problem. 56.9% of students' study time is overlapped with brothers or sisters. Insufficient learning equipment affects learning effectiveness and easily causes family problems. Furthermore, the interaction and evaluation of teachers and students neither the quantitative standards nor methods can eliminate parents' doubts (65.3%). In addition, according to the observation of the researchers, after-school homework for distance teaching is about 30% more than normal class, which is easy to cause learning fatigue. Extends the time for study, and also causes disturbances in daily life. Furthermore, the long-term focus on the computer or mobile phones also cause an excessive burden on students' eyesight, and all kinds of problems are worthy of concern (Hong Shanyong, 2020), and expect to have strategies to solve such problems in a timely manner.

According to the survey, the promotion of distance teaching must have complete supporting measures to be able to go for a long time.

### **4.The solution**

Faced with the difficulties that above-mentioned, the school is based on the principle of learning first, and the leaders must integrate the school's resources and listen to the opinions, and work together come up with a strategy to solve the problems, including:

#### **(1)The concept of communication improves the mentality of teachers and students.**

Changing the learning mentality of teachers and students is a necessary process for the promotion of distance teaching. Teachers and students who are accustomed to physical teaching do have a mentality of resistance to distance teaching. In fact, distance teaching is a strategy and means. The important key is the teaching strategy and teaching design. A good teaching design is the key of "suspension of classes and no suspension of learning". And to change the mentality of teaching and learning

between teachers and students is the key of success.

**(2) Widely raising funds to upgrade equipment.**

85% of teachers admit that there is a disparity between urban and rural areas in distance teaching. Therefore, how the school uses its own resources, build complete equipment and expand network bandwidth, produce digital teaching materials, provide appropriate software, and training teachers to use technology skills can ensure the continuous implementation of distance teaching.

**(3) Provide curriculum consulting mechanism and digitize collaborative teaching materials.**

Exquisite teaching design and contents are one of the best ways to improve professional teaching. Detailing the professional technology of teaching (Ye Jianhong, Ye Zhenni, 2020) is a mechanism that requires schools to provide curriculum design consultation. Digital video shooting, production of auxiliary animations, picture annotations, etc. will help students learn various courses in more detail to make up for flaws that cannot be implemented.

**(4) Promote diversified teaching assessment to ensure the quality of learning.**

The evaluation of distance teaching does have its difficulties and blind spots. Consequently, the design of multiple teaching and evaluation development is necessary. And the time of distance teaching is easy to prolong the students' learning not only the physiological load, but also the psychological quality challenges.

Therefore, it is necessary to create students' active participation and high interest in learning, and maintain learning progress (Tsai, Lin, Hong, & Tai, 2018). Allow students to maintain a sense of responsibility for independent learning (Tsang, 2020).

According to this, the promotion of multiple evaluations and teaching is demanding, including: situational action learning, competition Games, video sharing, peer review, topic discussions, sharing and collaboration platforms, role-playing, etc. Create students' active participation and high interest in learning

**(5) Shooting practical SOP process and detailed videos, providing students with proficient practice to solve the lack of practice.**

52.7% of teachers and students reported that it is difficult to conduct physical courses, especially operational courses, such as: technical courses as car maintenance, lathes, and hydropower installations do have difficulties in explanation and practical experience. It is recommended that schools combine with the industry to make film of SOP (Standard Operation Procedures) and detailed explanation videos of various practical courses, and provide students to practice repeatedly. This is the same as the digital textbook proposed by Wang Peiqing and Shi Xinhua (2014) claim that digital textbooks can be produced once, multiple used and low cost.

#### **(6) Communicate with parents to reach a consensus.**

The curriculum changes have indeed caused a lot of troubles to parents. Schools can create distance teaching commentary and multiple evaluation plans, so that parents can integrate with school into a learning and growth community. Design some courses that allow parents to participate in learning to resolve their doubts and allow them to act as facilitators of learning. (Zheng Wanlin, 2021).

### **5. Conclusion**

In addition to the implementation of distance education for response to the impact of the epidemic, this research has the following viewpoints to provide in long-term development consider:

As the education authorities: the establishment of a central-level digital teaching material center, planning for the digitization of curriculum materials at all levels in long-term, and the development of multiple evaluation tools for digital teaching are urgently needed.

As the school leaders: In response to the epidemic, schools implement distance teaching. The key of success lies not in technology but in the determination of the promoters and the support system of the school. The leaders and the willingness to cooperate with the teaching team, and the normalization of teaching design and teaching mentality.

As the teacher concerned: the teacher of the physical operation can also divide the students into parts, arrange a 1-1 zero-contact mentoring learning model, provide individual guidance for a single student to return to school to make up for the shortcomings of distance teaching, and truly implement the purpose of “suspension of classes not suspension learning”.

In addition to the implementation of distance teaching, schools can also give assistance to disadvantaged students with equipment, enhancing teachers' abilities, expanding digital learning and constructing teaching databases. To make the distance teaching become a normal mode of school teaching.

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# A Positioning of the Japanese System in the Research of Comparative Vocational Education and Training

— Some Questions to Comparative Models by a Few German Researchers—

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## **[Abstract]**

This presentation tries to point out some problems of methodology, especially by German researchers for comparative modeling on vocational education and training (VET) which are made basing on the view point of commitments by state and market to VET. At the same time, author positions Japanese each VET sub-systems into his revised comparative model, and characterizes total system compactly.

Simple comparisons are repeated recently too (Busemeyer/ Trampush 2011, Wolf 2020) by using the axe, state regulation or company involvement. As the result, the Japanese system is categorized into “segmental” skill formation system which initial VETs are segmentally managed and exercised by each company regulation.

Indeed, Japanese industrial world has highly internal labor market oriented. But, there are some significant problems, firstly, the scope (from start point to ending point) of the initial VET is unclear, and secondly, the complex VET sub-systems within each country are not verified in these discussions. Thirdly, they have not discussed on the school VETs at all.

As the result of explanations and analyses of authors’ three-dimensional, *cubic model* and transition model for VET, we can conclude that Japanese system is not simply typed into the “market model” (Greinert) or “*segmentalist* skill formation model”, but rather into the “mixed (successive in the time) model” by state (schools) and market (companies)”, because trainings of vocational schools, colleges and universities are complemented after employment and completed by in-company systematic training

## 1. Preface: task and method

This paper tries to point out some problems of methodology, especially recent comparative typologies by German researchers on vocational education and training (VET) which are based on the view point of commitments by state and market to VET. At the same time, author shows his comparative models which were formerly devised with some revisions, and to position the Japanese each VET systems (institution) into the model. Also, the character of total system is compactly concluded.

Author adopts a method of qualitative analysis on preceding and author's literatures

## 2. Preceding typologies on comparison of VET 2-1. The criterion training place (provider)

It was official works in some countries that they started to compare their own systems with preceding developed ones for VET, e.g. in French or England in earlier stage of industrial

revolution in 19<sup>th</sup> century so they founded a new school or university system as a substitution of apprenticeship system more or less. It was the era of imitation in comparative study of VET.

The earnest and detailed typology of VET were undertaken as official comparisons by a few international organizations such as the labor and economy affairs (ILO 1962, OECD/ Grégoire 1967) or education and culture (UNESCO 1962). Its comparison was **typologies on the learning cites** (the kind of administrative authority) which kind of institution for VET was characteristic or main stream in each country. Each main secondary VET institution is categorized into apprenticeship system, part-time vocational school, dual system, sandwich system (between school and in-company training), full-time vocational school and comprehensive school etc.

### 2-2. Greinert's one dimensional comparison

Author understands that more academic studies were expanded in influences by European common vocational training policy and the comparability works among each countries' qualifications since later 1980's (Terada 2009, 2011 a). Concerning to German discussions, Greinert, W.- D. (1993, 1994) was known as an exponent for sociology-oriented researcher. After all, it can be understood why leaning cites are classified in such sense and leaning (attendance) form are differentiated.

So, he pointed out three patterns for existential style of VET, "market model (in-company training)", "state model (school VET)" and "mixed model (dual model)" of VET from the view point of the one-dimensional comparison, basing on the theory of

Max Weber’s ideal types, state’s intervention (regulation) to VET.

There were some sympathies to this typology as a sociology-oriented author, but it was so rough typology, e.g. Japanese system was typed within the first patten, market model, as well as the USA and England.

After then, some multi-dimensional comparisons were tried to construct against to Greinert’s too simplified discussion. They were three dimensional comparisons by Blossfeld, H. P. (1993) and Deißinger, T. (1995) which were referred later.

**2-3. Repeated sociology or politics-oriented discussions and questions**

Nevertheless, comparatively simple typology has been repeated at least in Germany. One case can be shown in the series of comparative study on VET by the Research Center of Cologne University (2020). The symbolic discussion is presented in the article by Wolf, S. (58-78) in which a comparative political economy typology is directly succeeded from Busemeyer and Trampusch (2012). VET is said in other words such as “skill formation system”. His typology is shown in Table 1. Two axes, public commitment and involvement of companies to initial VET which are same one dimension as regulation subjects, are used in two categories (high and low) for each axis.

**Tab. 1. TVET in advanced industrial democracies**

<i>Public commitment</i>	High	Statist skill formation system eg. France, Sweden, ...	Collective skill formation system eg. Germany, Denmark, Austria, Switzerland, ...
<i>to vocational training</i>	Low	Liberal skill formation system eg. USA, Greate Britain	Segmentalist skill formation system eg. Japan
		Low	High
Wolf (2020), 65.		<i>Involvement of companies</i>	<i>in initial voational training</i>

There are **some significant questions** to this frame work.

First question is that this discussion expanded basically Greinert’s one-dimension model, but dare to divide into four patterns by making one axis to each pole of Greinert’s one dimension (regulative subjects). More multi-dimensional comparison including the pedagogical aspect is needed.

Secondly, the concept “initial vocational training” is unclear. What is the initial VET and does it mean from when to when. At least, concerning Japanese segmental system,

it seems to mean only Japanese in-company training, and school VET is out of his view.

The segmental in-company training system is indeed so characteristic for Japanese total training system and labor market customs (internal skill formation), but there is a big school (public) sector for VET in Japan too. In-company training is has the meaning for completed stage of initial training, but generally rather belongs to further training system.

UNESCO (2021) defines the initial VET as “” general or vocational education carried out in the initial education system, usually before entering working life. Ore-employment training for an occupation, generally divided into two parts, basic training followed by specialization”. In Japan, we have many kinds (sectors) of school vocational education institutions education before the employment stage.

Thirdly, the comparison of system should not be conducted only by analyses of static system structure, but by analyses of dynamic training (developing) process.

### 3. Multi-dimensional comparison of VET

#### 3-1. Three dimensions and sub-apparatus within each dimension

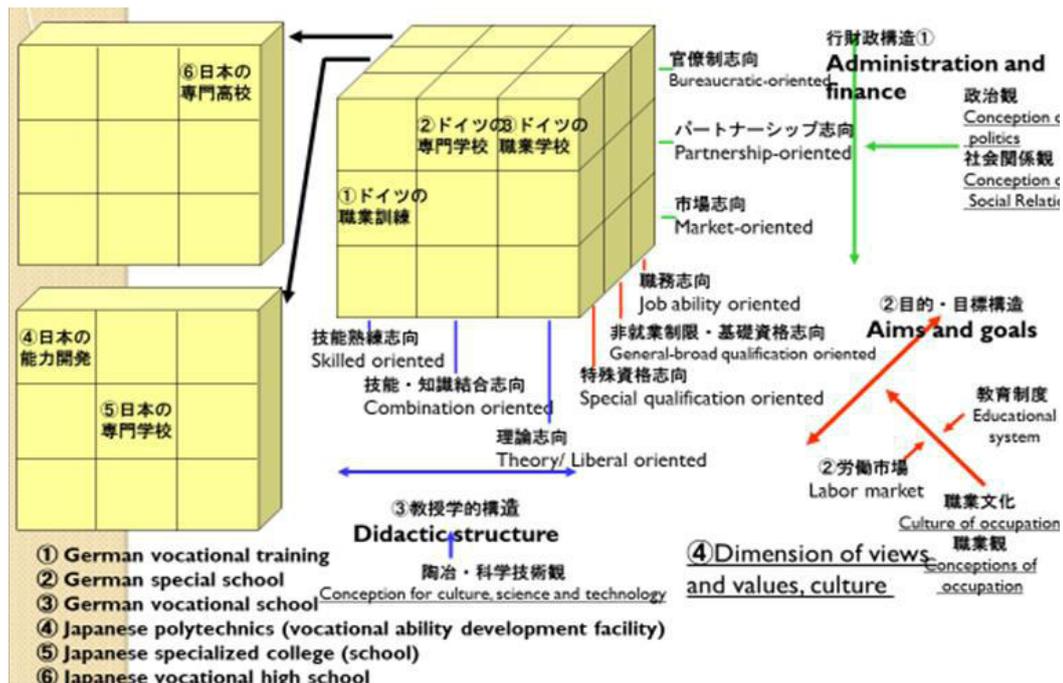
Some typologies in which researchers focus on only their own specialties, e.g. sociology, economic politic and labor market theory etc., are academically inadequate, because VET is originally an interdisciplinary matter between educational (training) science and labor economy or socio-political issue. So, author had already shown so-called “*cubic (three) dimensional model*” in a Japanese journal in 1998 (Terada 1998), and a few English versions’ books (e.g. Terada 2003). He presented three dimensions for comparison and structural understanding of VET and a series of analytical apparatus within each dimension, referring to mentioned above discussion by Prof. Blossfeld and Prof. Deißinger. The newest and revised version is shown in Figure 1.

We had better to set dimensions for comparative and structural analyses as many as possible. But, author restricted three dimensions, not only the political or regulative structure (*Administrative and financial dimension*), the curriculum and teaching method structure (*didactic and pedagogical dimension*) and the relevance structure to occupations or sciences (*labor market dimension* concerning training aim) for the time being.

At the same time, he prepares for one set of analytical apparatus within each dimension for qualitative poisoning of each kind of vocational institution among diversified ones in each country or region. State- company- and partnership oriented are set within the administrative and financial dimension, theoretical (and liberal arts)-

practical- combination oriented within the didactic and pedagogical dimension, and general job ability- broader qualification-specific qualification oriented within the relevance to occupation.

Figure 1. Three dimensions for comparison of VET



### 3-2. Representative VET institutions which have various qualitative characters in Japan

Observing by such method, we can know that there are many or various vocational institutions which have specific qualities in each country or region. Here each institution is explained for each dimension.

#### — Administrative and financial structure

Concerning the financial aspect among these dimensions, the burden of training cost (national or public aid) is a little complicated. Many public vocational high schools and fewer national colleges of technology and vocational universities or polytechnic colleges are basically aided by the central government or local governments. But, private vocational high schools and short-term colleges (higher education) are paid by some public aid and students' high rate tuition fees. Most specialized training colleges as the major higher vocational education institutions are private corporations and has not a public aid system, because of administrative control under local government (not

Ministerium).

Contrasting to the financial system which has some distinctions between public or national schools (colleges) and private ones, regular administration and direction such as the establishment approval and the curriculum or teacher issues are so strongly centralized by the Ministry of Education (MEXT) or the Ministry of Labor (MHLW). Each institution has no space of discretion for each institution. Concerning to schools and colleges (universities),

it has a so strong public commitment and bureaucratic oriented.

#### — Relevance to occupation or vocational activity

Ahead, about the relevance to occupation, author mentioned the existence of three sub-systems in the dimension of the relevance of VET to working activity in Japan.

Obeying to the discussion by Wolf's and Busemeyer et.al., the segmental skill formation system in the initial VET is taken place in companies in Japan. But, firstly, there are such training sub-systems as trained according to national qualification standards. Author expresses this first vocational education sector as a "Western style", "**vocational education in narrow sense**", and they are mainly positioned within the sector of outside "school (学校) and university (大学)" which are regulated by the §1 School Education Law. In such sector as more vocational and strong occupational training, curriculum and educational method are rigorously determined by other Ministerium's' guidelines too (social welfare, hygiene, nursing, information technology, many kinds of technicians trained in polytechnics). Here, they are so bureaucratic too.

The second and typical Japanese type is **VET in broader sense**, and implemented within the school and university sector. These institutions, vocational high schools, colleges of technologies etc. don't intended to train students for direct preparations (completed initial VET) for occupation practice, but train work forces who have flexible relevance to vocational branch, rather to each industry branch such as agriculture, technical industry, commerce and fishery-marine. So, in Japan, men have being called as "**Sangyo-Kyoiku (産業教育 = industrial education)**" for a long time, after the Second World War, especially since 1951. It relates to curriculum structure as the next discussion.

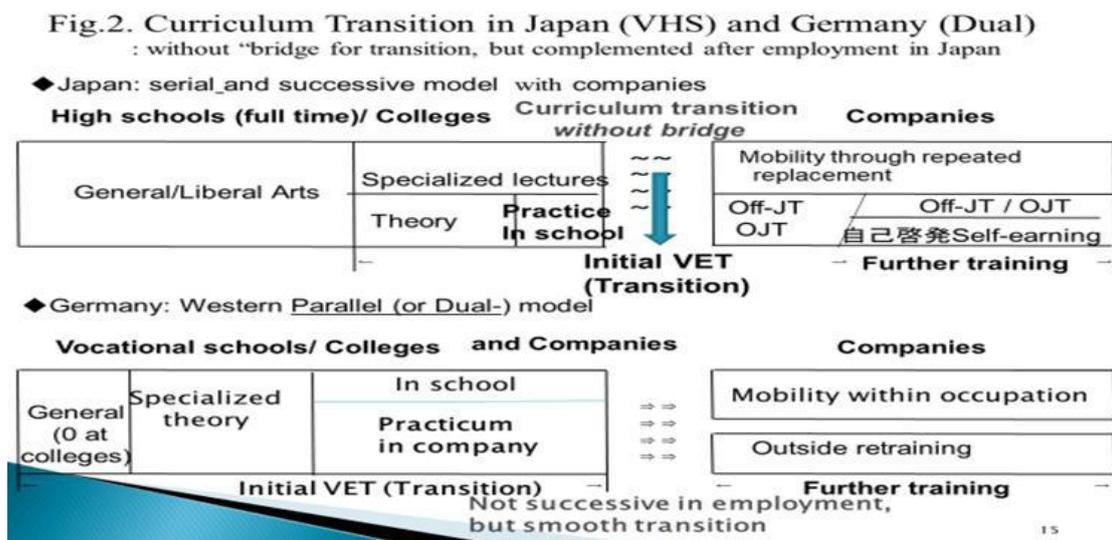
The third type of VET is **the mixed type between the broader and the narrower**, and can be seen in some departments of high schools (architecture or electrical engineering etc.) and universities of applied sciences introduced recently (since 2020).

— **Didactic structure: especially the relationship between knowledge and skills**  
Didactical and pedagogical structures reflect jurisdiction or administration of VET. School VETs, at high school level and higher education level too, are generally school-based training, and specialized subject oriented with general education or liberal arts and without practicum. On the other hand, occupation-oriented VET ought to provide a lot of practicum in enterprises, but not much as German secondary dual system. Therefore, those who engage in the latter VET characterize their practices as “the balance of both elements, knowledge and skills” or “combination between both”.

#### 4. Comparative model in the view point of transition from VET to working life

##### 4-1. Three kinds of transition processes

Finally, author discusses on the comparison of VET from the view point of transition process. System comparison mentioned above depends on static structural (functionalism) approach. We need frame work a little more dynamic approach. OECD presented a *learner centered approach* (OECD 2000), and author proposed three transition processes through expansion of the OECD’s discussion. We have to notice three sub processes, firstly organizational (job recruitment to an enterprise organization), secondly curriculum (in the sharing relationship of training content by school and enterprise) and thirdly psychological transition from school (VET) to working life (vocational activity) (Terada2011, 2014).



##### 4-2. Serial and successive complementary relationship between schools (VET) and enterprises in the curriculum transition: explanation on Fig. 2.

Firstly, it’s clear when and where the initial VET starts and ends in Germany, because cooperative (dual) and parallel relationship between schools and enterprises makes the

initial training conclude before employment. But in Japanese school and college VET, it's unclear, and school training (initial training) is complemented after employment in the new comer training (OJT Off JT and introductive shop placements).

Secondly, so, school (college) VET doesn't provide the specialized job training (field practicum) to students. Terada expressed this curriculum relationship as "VET without a bridge for transition" (2011). Though the sharing relationship for curriculum in the stage of school study is weak and loose between both sides, this weak relationship is complemented by the strong relationship in which school side involve in recruiting process from study stage

(12<sup>th</sup> grade for H S students). Through this job seeking and selective (mainly recommendation by schools) process, students prepare for vocational socialization to the working life. School broader VET

Thirdly, therefore, VET before employment can be focused on the basic specific training to industry, knowledge training and some basic practical training. Also, over a half general subject (VHS) or about one seventh liberal arts (universities and colleges) must be studied in Japan.

## **5.Short Conclusion**

Surely, there is a strong segmental labor market system (systematic in-company trainings) in Japan. But, that may be one advantage for Japanese enterprise societies in the fact that they have systematic in -company training and labor customs.

Also, it can' be said simply that initial VET is provided in segmental enterprise world which hasn't common national standards, horizontal labor market. There is one sub system for occupation-oriented VET corroborated by national qualifications (laws) in Japan. Also, even if we notice non- occupation-oriented VET as the typical Japanese type, we can conclude as complementary relationship between schools (colleges) and enterprises which is reserved in time lag (not parallel). In that meaning, we can define the Japanese VET model as "anteroposterior co-complementary model between schools (colleges) and enterprises".

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# **Construction and Application of Students' Conditions Analysis Model for Professional Course Teachers in Vocational Schools**

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## **Abstract**

The analysis of students' conditions is an important tool for promoting teaching reform in vocational schools. Based on the definition of the connotation of "students' conditions analysis", the framework and indexes of students' conditions analysis model for professional course teachers in vocational schools were initially constructed according to the existing literature, theoretical foundation and practical research. The "Investigation Questionnaire on Students' Conditions Analysis for Professional Course Teachers in Vocational School" was further compiled, and the students' conditions analysis model was verified, which divided students' conditions into three dimensions: students' pre-existing status, potential status and difference status. The model was used to evaluate professional course teachers in secondary vocational schools in Jiangsu, Zhejiang and Shanghai in China, and it was found that current degree of analysis of students' conditions by teachers was generally not high, and there were significant differences in teaching age, professional title, and teaching competition award level. However, there was no significant difference in age and academic qualifications. In order to improve teachers' ability for analyzing students' conditions, teachers need to build a systematic framework of students' conditions and analyze students' conditions as needed; schools should also strengthen the guarantee of students' conditions analysis and create a good atmosphere for teachers' analysis.

*Keywords:* Vocational schools; Professional course teachers; Content of students' conditions analysis; Model evaluation

## 1. Background

Currently, the following classroom teaching dilemmas exist in vocational schools: students say the course is difficult to learn and understand, teachers are confused that students can't learn.

How to effectively alleviate this problem, the analysis of students' conditions by teachers is an important grasp. The analysis allows teachers to teach effectively by following students' multiple intelligences; select work assignments that match students' learning abilities and help them acquire vocational skills.

A review of the existing literature reveals that the current vocational education field has paid less attention to the analysis of students' conditions. In terms of research content, the division of the elements of students' conditions mainly refers to general education, and no consensus has been reached yet. This study aims to solve the following three questions. Firstly, what are the elements of students' conditions that teachers should pay attention to? Secondly, what is the current status of students' conditions analysis by professional course teachers in vocational schools? Thirdly, how to improve the ability of teachers to analyze students' conditions?

## 2. Basis for the construction of students' conditions analysis model

It is necessary to clarify the connotation of "students' conditions analysis" before constructing students' conditions analysis model. In this study, "students' conditions analysis" is defined as the analysis of student information that effectively influences student learning and teacher teaching at the pre-, mid-, and post-teaching stages. After clarifying the concept, this study will combine existing literature, theoretical foundations, and practical research to explore which information teachers need to focus on when analyzing students' conditions.

### 2.1 Literature review

There is a wealth of research on the elements of students' conditions, and the classic division is shown in Table 1.

Table 1  
classical division of elements of students' conditions

	General Characteristics				Starting Point Ability			Learning Style	Others
	Physiology Characteristics	Cognitive Characteristics	Social Features	Emotion Characteristics	Starting point knowledge	Starting Point Skills	Starting Point Attitude		
R.M•Gagne (2007)		√	√	√	√	√	√		Individual Differences
W•Dickie (2007)		√	√	√	√	√	√		Attitudes towards Teaching Content and Teaching Systems Group Characteristics
G.R•Morrison (2007)	√	√	√	√	√	√	√	√	Characteristics of Exceptional Learners
Sheng Qunli (2001)		√		√			√	√	Learning Motivation, Learning Perseverance
Shao Yannan (2013)		√					√		Learning Interest, Learning Environment, Learning Strategies
Yu Deying (2015)		√		√	√	√	√		Leaming Interest
Deng Zemin (2017)	√	√	√		√	√	√	√	Attitude towards Teaching System

As can be seen from Table 1, researchers pay more attention to the general characteristics, starting point abilities, learning interests and learning styles of students. In addition, some scholars' dimensional classification of students' conditions is worthy of reference, for example, the classification of students' conditions into "known, unknown, able to know, want to know, and how to know". It is worth noting that the above classification is mostly the research results in the field of general education, although some of the indicators can be integrated with vocational education, but only focusing on these elements will ignore the special characteristics of vocational school students' learning conditions. Thus, some relevant indicators still need to be improved by subsequent practical research.

## 2.2 Theoretical foundation

### 2.2.1 Nearest Development Zone

The Nearest Developmental Zone refers to "the gap between the student's current level of independent problem solving and the potential level that can be achieved with teacher guidance. (schenk, 2003) The value of this theory for the analysis of students' condition is that, on the one hand, it enriches the content of students'

conditions. Teachers should not only pay attention to the students' existing abilities (e.g., the level of knowledge and skills they have already mastered), they also need to focus on students' potential developmental space. On the other hand, it extends the outreach of students' conditions analysis. Students' nearest developmental zone is a dynamic concept, and students' nearest developmental zone will keep changing because their current level will improve continuously after teachers' guidance. Therefore, teacher's grasp of the students' conditions should also be constantly followed up throughout the classroom teaching.

### 2.2.2 Constructivist Theory

Constructivist Theory emphasizes that students play a subjective role in teaching and learning activities, and each student's individually constructed knowledge system differs due to their own knowledge bases and life experiences (Zhong Zhixian and Xu Hongjian, 2000). This theory enlightens teachers to expand the content of students' conditions. Teachers should pay attention not only to students' knowledge bases but also to their past practical experiences, current learning situations, and their individual differences. In addition, since the process of students' construction of knowledge is changing dynamically, the analysis of students' conditions should also be followed in time.

### 2.2.3 Meaningful Learning Theory

Meaningful Learning Theory further broadens the elements of students' conditions analysis from a psychological perspective. The theory emphasizes the important role of the psychological mechanism of "assimilation" in learning, which is the process of transforming knowledge structures into cognitive structures (Wang Huilai, 2011). In addition, Ossubel also pointed out that students' internal and external motivations, including cognitive, self-improvement, and subsidiary motivations (Shi Liangfang, 1994), all have an impact on learning. Therefore, teachers should also focus on students' cognitive structures and learning motivations during analysis.

## 2.3 Practical Research

In order to explore the special characteristics of the analysis of students' conditions of professional course teachers, based on the existing theoretical foundation and literature research, the author further conducted in-depth interviews with 15 professional course teachers of secondary vocational schools in Shanghai who are experienced in teaching and have strong oral expression skills. The content of the interviews focused on teachers' conceptual understanding of students' conditions

analysis and the elements of analysis that they pay attention to in the teaching process. The interview time per person was more than 40 minutes, and the transcribed texts were coded at three levels after the interviews were completed, resulting in the following elements of students' conditions (see Table 2).

Table 2  
elements of students' conditions analysis

Level 1 Indicators	Secondary indicators	Tertiary indicators
students' pre-existing status	learners' learning base	professional knowledge base professional skills base professionalism life and practical experience
	general characteristics of learners	cognitive characteristics learning style general learning ability practical ability learning attitude learning habits will to learn personality characteristics
students' potential status	learners' motivation	career planning professional learning interest support from parents, teachers and classmates
	learners' learning needs and possibilities	needs at different ages needs arising from learning (curiosity points) learning difficulties learning misconceptions innovation points generated in learning learning strengths
students' difference status	learners' group differences	class differences differences in students' origin gender differences grades differences

In summary, combining existing studies, theoretical foundations and interview research, the content of student's conditions analysis of professional course teachers in vocational schools can be roughly divided into students' pre-existing status (containing students' learning bases and general characteristics), potential status (containing students' learning motivation, learning needs and possibilities), and difference status (various group differences of students).

### 3. Validation of model of students' conditions analysis

#### 3.1 Questionnaire preparation and revision

The study adopts the self-compiled questionnaire called "Investigation Questionnaire on Students' Conditions Analysis for Professional Course Teachers in Vocational School". It includes two parts: basic teacher information and questionnaires on students' conditions analysis by teachers, which is based on the existing theories and interview indicators. At the same time, a number of vocational education experts and vocational school teachers are invited to evaluate and revise the initial questionnaire. The initial questionnaire is preset with 3 dimensions, including students' pre-existing status ( C1 ~ C10), potential status (C11 ~ C18), difference status (C19 ~ C22). After the questionnaire was formed, 264 professional course teachers of secondary vocational schools in Jiangsu, Zhejiang and Shanghai were tested to correct the items. Finally, the revised questionnaire still retains the three original dimensions, but the items are reduced to 18 items.

#### 3.2 Reliability analysis

The study used Cronbach's Alpha value to test the reliability of the questionnaire, and as shown in Table 3, the reliability was high.

Table 3

Reliability of questionnaire

	Number of items	Cronbach's Alpha Value
Total questionnaire	18	0.936
Dimension 1: Pre-existing status	8	0.906
Dimension 2: Potential status	6	0.873
Dimension 3: Difference status	4	0.836

### 3.3 Model validation tests

The study used AMOS software for validated factor analysis, and the high fit of the model indicators indicated that the existing students' conditions analysis model was of high quality.

Table 4

Fit of the model for student's conditions analysis

	Indicators	Fitting criteria	Data results	Fitting judgment
Absolute fit index	$\chi^2/df$	Between 2 and 5	2.417	pass
	RMSEA	<0.08	0.056	pass
Relative fit index	RMR	<0.05	0.042	pass
	GFI	>0.9	0.907	pass
	NFI	>0.9	0.918	pass
	TLI	>0.9	0.941	pass
	CFI	>0.9	0.950	pass

## 4. Application of model of students' conditions analysis

After the revision of the questionnaire was completed, an electronic questionnaire was distributed to professional course teachers in secondary vocational schools in Jiangsu, Zhejiang and Shanghai in China, and 382 questionnaires were collected, of which 338 were valid, with an efficiency rate of 88.48%.

### 4.1 The basic status of student's conditions analysis of professional course teachers in vocational schools

#### 4.1.1 The degree of analysis of all elements of student's conditions

The study used a five-point Likert scale for teachers to self-assess their student's conditions analysis, ranging from "hardly ever" "occasionally" "sometimes" "often" and "always" on a scale from 1 to 5. On the whole, current professional course teachers of secondary vocational schools have a low level of analysis of all elements of student's conditions, with a mean value of 3.66, which has not yet reached the level of "often". In addition, there are differences in the extent to which teachers analyze different students' status. The survey shows that teachers' analysis of students' pre-existing status (mean 3.80), difference status (mean 3.63), and potential status (mean 3.49) decline in descending order.

#### *4.1.2 The degree of analysis of students' pre-existing status*

As shown in Table 5, teachers' attention to students' learning attitudes, professional knowledge base, learning habits, professional skills base, and practical ability is high and close to the level of "often". Relatively speaking, they pay less attention to students' general learning ability and cognitive characteristics, and pay the least attention to students' professionalism.

#### *4.1.3 The degree of analysis of the students' potential status*

As shown in Table 5, teachers pay relatively more attention to students' learning interests, learning needs and learning strengths, but they are far from the level of "often"; they pay very little attention to students' external learning motivation and career development plans, and they just reach the level of "sometimes". Students' external learning motivation and career development plans are important motivations for learning professional courses, and the lack of relevant analysis and targeted guidance is not conducive to students' active learning.

#### *4.1.4 The degree of analysis of students' difference status*

As shown in Table 5, teachers pay more attention to students of different classes and different grades, which is close to the level of "often". Relatively speaking, less attention is paid to students of different gender and places of origin.

Table 5

The extent to which teachers analyze each element of students' conditions

Level 1 Indicators	Secondary indicators	M±SD
students' pre-existing status	professional knowledge base	3.96±0.90
	professional skills base	3.88±0.97
	professionalism	3.51±1.10
	cognitive characteristics	3.59±0.97
	general learning ability	3.64±0.93
	practical ability	3.86±0.85
	learning attitude	4.06±0.85
	learning habits	3.93±0.93
	learning strengths	3.55±0.95
	career development plan	3.28±1.08
Students' potential status	learning interests	3.70±0.91
	external learning motivation(support from parents, teachers and classmates)	3.42±1.00
	needs arising from learning	3.60±0.88
	innovation points generated in learning	3.41±0.96
Students' difference status	class differences	3.83±0.93
	differences in students' origin	3.49±1.02
	gender differences	3.46±1.02
	grades differences	3.75±0.90

#### *4.2 Differential characteristics of student's conditions analysis of professional course teachers in vocational schools*

##### *4.2.1 Gender differences*

As shown in Table 6, the independent samples t-test shows that there is no statistically significant difference between male and female teachers in the degree of analysis of students' pre-existing status, potential status and difference status ( $p>0.05$ ).

##### *4.2.2 Differences in teaching age*

It can be seen from Table 6 that after the F test, there are significant differences in teacher's analysis of students' pre-existing status and difference status in the teaching age, and further post-inspection can find that teachers with 16-20 years of teaching experience analyze the pre-existing status and difference status of students significantly more than teachers with 0-5 years of teaching experience. In addition, there is no significant difference in the degree of teachers' analysis of students' potential status in

terms of teaching age, and the average self-assessment is lower than 3.6, which does not reach the level of “often”.

#### *4.2.3 Differences in academic qualifications*

It can be seen from Table 6 that after the F test, there is no significant difference in the analysis of student's conditions of teachers with different academic qualifications.

#### *4.2.4 Differences in professional title*

It can be seen from Table 6 that after the F test and post-inspection, teachers with associate senior titles analyze all dimensions of students' conditions significantly more than teachers without titles. Teachers with intermediate professional titles have a significantly higher level of analysis of students' pre-existing status than teachers without titles. Teachers with associate senior titles have a significantly higher level of analysis of students' potential status than teachers with positive senior titles.

#### *4.2.5 Differences in teaching competition award level*

It can be seen from Table 6 that after the F test and post-inspection, teachers who have won national teaching competitions analyze the pre-existing status of students significantly more than teachers who have not won. Teachers who have won teaching competitions at district and county level and above have a significantly higher degree of grasp of students' potential status than teachers who have no experience of winning. In addition, teachers who have won teaching competitions at district and county level have a significantly higher degree of analysis of students' differential status than teachers who have no experience of winning.

Table 6

Differences in the characteristics of teachers' analysis on students' conditions

Construction and Application of Students' Conditions Analysis Model for Professional Course Teachers in Vocational Schools

	Specific indicators	students' pre-existing status (M±SD)	students' potential status (M±SD)	students' difference status (M±SD)
Gender	Male	3.84±0.76	3.57±0.76	3.70±0.76
	Female	3.78±0.71	3.44±0.75	3.59±0.81
	t	0.704	1.537	1.345
Teaching age	0-5 years①	3.57±0.80	3.31±0.81	3.40±0.91
	6-10 years②	3.85±0.61	3.48±0.66	3.51±0.64
	11-15 years③	3.89±0.70	3.56±0.70	3.73±0.78
	16-20years④	3.95±0.78	3.58±0.84	3.83±0.71
	More than 20 years⑤	3.84±0.68	3.58±0.71	3.76±0.77
	F	3.118*	1.927	4.003**
Academic qualifications	Post-inspection	④>①	n.s.	④>①
	Specialist and below	3.25±0.81	2.93±0.65	3.85±1.01
	Bachelor	3.84±0.72	3.52±0.74	3.67±0.78
	Master	3.74±0.75	3.43±0.81	3.50±0.84
	PhD	3.17±0.88	3.44±0.35	3.42±0.80
Professional title	F	2.410	1.203	1.056
	Unrated①	3.47±0.84	3.26±0.88	3.28±0.96
	Primary②	3.72±0.71	3.43±0.70	3.60±0.79
	Intermediate③	3.86±0.68	3.47±0.73	3.61±0.80
	Associate Senior④	3.96±0.68	3.69±0.71	3.84±0.67
	Positive Senior⑤	2.94±0.94	2.42±0.40	3.44±0.38
	F	5.505***	5.203***	4.162**
Teaching competition award level	Post-inspection	③>①, ④>①	④>①, ④>⑤	④>①
	None①	3.59±0.82	3.26±0.85	3.44±0.94
	School level②	3.79±0.52	3.42±0.63	3.65±0.76
	District and County Level③	3.86±0.71	3.65±0.67	3.83±0.74
	Provincial level④	3.88±0.68	3.60±0.70	3.65±0.68
	National level⑤	4.25±0.53	3.81±0.64	3.87±0.55
	F	5.763***	5.324***	3.162*
	Post-inspection	⑤>①	③>①, ④>①, ⑤>①	③>①

n.s. p>0.05    \*p<0.05    \*\*p<0.01    \*\*\*p<0.001

## 5. Suggestions

### *5.1 Construct a systematic students' conditions analysis framework and analyze as needed*

Constructing a systematic analysis framework requires a clear definition of the position of students' conditions analysis at the macro level, and detailed analysis indicators at the micro level. At the macro level, teachers in vocational schools need to realize that the analysis is a dynamic and continuous process, including the pre-, mid-, and post-teaching stages, and none of them are indispensable. At the micro level, teachers should strengthen the analysis of students' conditions that are easily overlooked in practical teaching, such as students' professionalism, learning motivation, and career planning. In addition, in view of the numerous elements of students' conditions and the limited teaching energy of teachers, teachers only need to selectively analyze students' conditions according to teaching needs.

### *5.2 Schools should strengthen the guarantee of students' conditions analysis and create a good atmosphere for analysis*

On the one hand, the school should use the teacher's analysis as an indicator of daily teaching ability assessment, guide teachers to pay attention to students, and strengthen teaching reflection. On the other hand, schools must provide comprehensive guarantees and create a good atmosphere for teachers' analysis, including moderately reducing the size of classes, exploring small-class teaching to alleviate teachers' teaching pressure; deepening the reform of teacher management and evaluation systems, freeing front-line teachers from redundant non-teaching-oriented affairs and encouraging them to actively study vocational education pedagogy; further expanding the path of teachers' professional development and let new teachers deepen their awareness of students' conditions analysis and acquire skills under the leadership of veteran teachers.

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# **A Metacognition Concept into E-Instructional Design for Vocational Teacher Education Students: A Systematic Literature Review Study**

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The ability of metacognition is necessary to be mastered by students in vocational teacher education. This ability encourages the students as vocational teacher candidates to be able to conduct sustainable learning. This is mainly because metacognition ability has a high correlation with a learn-how-to-learn skill that is an essential skill for lifelong learning. This article aims to explore the metacognitive strategies that were usually used in classroom teaching and learning activities excluding the strategies for teaching language courses such as reading, writing, listening, and speaking because they have different characteristics with this topic. Systematic literature review (SLR) was used in this study for exploring pieces of literature over the past 10 years related to metacognitive strategies that were used in education. There are six stages of the SLR adopted from the study of Wondimagegn Mengist and his colleagues (Mengist, Soromessa, & Legese, 2020). Firstly, the scope of the study was defined in the step of “protocol”. Secondly, the “search” step was conducted to define search string and having search studies. Thirdly, the “appraisal” step was held for doing inclusion and exclusion of gathered pieces of literature based on peer-reviewed articles, relevant

topics, year of publication, language, and accessible papers. The fourth step was “synthesis” which has an objective to extract and categorize the data from the selected resources. Fifthly, the data from the previous step was analyzed and concluded through the “analysis” step. Ultimately, the “report” step was done to communicate the results. In this study, 8 pieces of literature were synthesized and analyzed to get insight into the research topic. The findings revealed that there were five general steps of metacognitive strategies that were in an iterative form which are 1) preparation, 2) planning, 3) monitoring, 4) evaluation, and 5) reflection. The specific characteristics of each step were also discussed in this article.

*Implications for practice or policy:*

- For being able to equip the students with the ability of sustainable learning or lifelong learning, metacognitive strategies should be introduced in teaching and learning activities.
- Using instructional technologies for accommodating metacognitive strategies could bring many benefits.

*Keywords:* metacognition, metacognitive strategies, e-instructional design, vocational teacher education

## **Introductions**

Educational media or other studies said instructional media has a significant role in teaching and learning activities. It has a role to be a guide in those activities for making sure that the learning materials could be delivered well and also it is a communication tool between the teacher and the students during teaching and learning activities (Farhadi, 2014). Educational media has many positive effects for enhancing the students' achievements during teaching and learning activities (Asmaputri & Refelita, 2019; Fadillah & Iswendi, 2019; Joni, 2015; Pipattanasuk & Songsriwittaya, 2020; Susilowati, 2017; Suyitno, Jatmoko, Susanto, Primartadi, & Mahfud, 2019; Viviantini, Amram Rede, 2015). Moreover, such media could also increase the knowledge acquisition of students (Saraswati, Kartini, & Agushyvana, 2020; Stang et al., 2020). Additionally, it could also help language development skills for students (Ganapathy & Jayabalam, 2016; Neuman, Wong, Flynn, & Kaefer, 2019). Ultimately, educational media takes a significant role in succeeding in teaching and learning activities.

Teachers also play significant roles in the educational area in particular for teaching and learning activities (Nielsen, 2010). This is mainly because teachers are key figures in education (Van Den Branden, 2016). They need to plan, design, implement, and

evaluate the instruction or teaching and learning activities, create instructional tools and media, construct instructional assessments, and also they need to be facilitators for their students during learning activities. They have significant roles in the success of students learning activities (Comi, Argentin, Gui, Origo, & Pagani, 2017). Moreover, they are the key to improving their students' learning achievements (Borman & Kimball, 2005; Bourdon, Frölich, & Michaelowa, 2010; Fryer, 2011; Goldhaber & Brewer, 2000; Keller, Neumann, & Fischer, 2017; Kunter et al., 2013; Miller, Ramirez, & Murdock, 2017; Westley, 2011; Yoon, Duncan, Lee, Scarloss, & Shapley, 2007). Therefore, teachers play a significant role in educational sectors so that they have a high correlation with the success of educational programs.

A kind of educational program that has crucial objectives for preparing students for being able to be ready to work is vocational education. This education equips their students with relevant and meaningful knowledge, skills, and attitudes so that they could be able to be qualified workers in a particular area (Haron, Mohammad Hussain, Ali, Che Rus, & Mohammad Zulkifli, 2019; Pilz, 2012). Additionally, because of its objective for producing qualified workers, this education could reduce the unemployment phenomena that many countries experience these phenomena (Fuller, 2015). This makes this education has significant impacts on the growth of the national economy (Bhurtel, 2015). Finally, improving the quality of vocational education could bring many benefits not only for the students but for the nation as well.

As teachers have significant roles in educational sectors, it enhances the importance level of the preparation programs of teacher candidates. These preparation programs are held in teacher education institutions. These institutions focus on delivering two elements which are learning the subject area and learning how to deliver the subject in the classroom environment (Kennedy, 1999). The qualified teacher candidates could make qualified educational programs in the future. This means, one of the ways for improving the quality of vocational education could be done through improving the quality of vocational teacher candidates. Ultimately, vocational teacher education institutions should pay attention to improve the quality of their programs so that they could produce qualified vocational teacher candidates and eventually could improve the quality of vocational education.

Several studies have been conducted to explore the needed competencies for being qualified vocational teachers (Arifin, Rasdi, Anuar, & Omar, 2018; Chakroun, 2019; Chee Sern, Hamisu, & Mohd Salleh, 2018; Grosch, 2017; Ismail et al., 2018; Jafar et al., 2020; Mulyadi, Sucita, & Purnama, 2019; Paryono, 2015; Rofiq, Surono, Bruri Triyono, & Setiyo Hari Purwoko, 2019; Spöttl & Becker, 2016; Tapani &

Salonen, 2019; Wagiran et al., 2019). Based on those several studies, there are many competencies that vocational teachers need to master so that they could be able to be qualified teachers. However, there is a competency as the most needed one for dealing with other needed competencies which is the ability to conduct sustainable learning during the working life. Vocational teachers are related to the development of science and technology in their particular expertise area. They need to be able to stay updated with that development since they need to conduct teaching and learning activities that are relevant to the needs of the world of work. This makes the students will be equipped with up-to-date knowledge and skills that will be meaningful for their future career life. Therefore, equipping the vocational teacher candidates with the ability of sustainable learning is necessary to be done.

Metacognitive ability is one of the needed abilities for succeeding in lifelong learning or sustainable learning activities (Steuber, Janzen, Walton, & Nisly, 2017). This is mainly because this ability is a learn-how-to-learn skill in many research studies (Al-jarrah, Mansor, Talafhah, & Al-jarrah, 2019; Bustingorry & Mora, 2008; Chiaburu, Cho, & Gardner, 2015; Devika & Singh, 2019; Jiménez, Puente, Alvarado, & Arrebillaga, 2009; Lumpkin, 2020; Ottenhoff, 2011; Papeleontiou-Louca, 2003; Pennock, 2020). This skill encourages individuals to be able to conduct sustainable learning effectively. Using metacognitive

strategies in teaching and learning activities brings many benefits related to the ability of lifelong learning. Firstly, these strategies could help students to be autonomous learners (Fu, 2007; Koc & Koc, 2016; Le, 2013; Magaldi, 2010; Owusu & Cobbold, 2020; Septiningrum, Tarwiyah, & Mariam, 2018; Wei Xu, 2016). Moreover, these could drive students' brains to find learning ways (Wilson & Conyers, 2016). Therefore, mastering the ability of metacognition is necessary to be mastered by vocational teacher candidates to be able to conduct effective sustainable learning.

## **Literature review**

### **Vocational Teacher Education**

#### *Vocational Education*

A type of education that relates to the world of work is vocational education. This education has a function to prepare the students to be able to work in accordance with the fields of their studies (Abdullah, Saud, & Kamin, 2019; Gough, 2010; Rösch, 2013). In other words, this education facilitates the students to be delivered in the working life (Hanushek, Schwerdt, Woessmann, & Zhang, 2017). Therefore, this

education consists of theory and practice in the teaching and learning activities (Fajra & Novalinda, 2020). These activities need to be relevant to the needs of the world of work so that the competencies that students have already gained will be meaningful for their future working life (Gunderson, 2004). Therefore, improving the quality of this educational type could become a way for reducing unemployment phenomena and improving the quality of human resources.

Since this education has an objective to deliver the students to working life, this education has contributions to the growth of the national economy (Bosch & Charest, 2008; Deaconu, Dedu, Igrę, & Radu, 2018; Guthrie, Harris, Simons, & Karmel, 2009; Iastremska & Martynenko, 2015; Magaji, 2015; Malhotra, 2015). Also, this education plays a significant role in the development of nations in general (Ichwanto, Hidayat, Sutikno, Devi, & Asfani, 2020; YAHJI, MAHFUD, & MU'AMMAR, 2019). This is mainly because this education could reduce the level of unemployment phenomena (Fuller, 2015; Korber, 2019; Korber & Oesch, 2019; Wiriadidjaja, Andriasanti, & Jane, 2019). By reducing these phenomena, the economic condition of a nation could become better, and eventually, the national economy could develop gradually.

### *Vocational Teacher*

Vocational teachers become essential players for the quality of vocational education. This is mainly because teachers have many important roles (Nielsen, 2010) and become key figures in education (Van Den Branden, 2016). Teachers are the important figures for improving the achievements of the students (Borman & Kimball, 2005; Bourdon et al., 2010; Fryer, 2011; Goldhaber & Brewer, 2000; Keller et al., 2017; Kunter et al., 2013; Miller et al., 2017; Westley, 2011; Yoon et al., 2007). Not only conducting teaching and learning activities for improving students' achievements but teachers also need to conduct administrative tasks (Shaikh & Khoja, 2012). These activities prove that teachers are the key players that determine the success of education and the vocational teacher education institutions have a big role in preparing qualified vocational teacher candidates.

As vocational education serves to prepare students to be able to work, vocational teachers have a role to equip the students with relevant knowledge and skills that are suitable to the needs of the world of work (Owais, Al Abidi, Hatamleh, & Hussein, 2020). This role could be done well if the teachers have three main competencies which are mastering the expertise materials, the ways for delivering those materials to the students and constructing the curriculum (Gamble, 2013). Moreover, in the era of technology, vocational teachers need to improve the quality of their educational activities with ICT (Ana et al., 2020) and make sure that their students could conduct lifelong learning as this activity is essential to be done in the working life in this era

(Wheelahan & Moodie, 2010). Not only their students, but the vocational teachers also need to have an ability for lifelong learning because they need to stay updated with the changes and development of science and technology both in the expertise and education area (Abdullah et al., 2019; Diep & Hartmann, 2016; Hunde & Tacconi, 2014; Nurhadi & Zahro, 2019). Therefore, equipping the vocational teacher candidates with the ability of sustainable learning is necessary.

The statement of the importance of equipping the vocational teacher candidates with the ability of sustainable learning or lifelong learning is supported by several studies of needed vocational teacher competencies. Firstly, vocational teachers need to keep abreast with technology along with their working life (Paryono, 2015). Secondly, they need to always keep their career development (Chee Sern et al., 2018). Thirdly, they need to keep themselves with new relevant technologies that can be used in the classroom teaching and learning activities (Arifin et al., 2018). Fourthly, during their career life, vocational teachers need to conduct research and innovation for making their educational activities better (Ismail et al., 2018). Fifthly, they need to follow the development of ICT both in the expertise or workshop area and in the educational area (Chakroun, 2019; Mulyadi et al., 2019). Sixthly, they need to have innovator competency that consists of several development activities in learning environments, working life, and several other skills (Tapani & Salonen, 2019). Seventhly, vocational teachers need to have a personality as people that are adaptive to technological development (Rofiq et al., 2019). Those mentioned competencies that vocational teachers are forced to master need the ability of sustainable learning during their career life.

## **Metacognition**

### *Definition*

Metacognition is noticed as an essential part of conducting effective sustainable learning or lifelong learning (Steuber et al., 2017). The term of metacognition ability is sometimes replaced by the term of learn-how-to-learn skill in many studies (Al-jarrah et al., 2019; Bustingorry & Mora, 2008; Chiaburu et al., 2015; Devika & Singh, 2019; Jiménez et al., 2009; Lumpkin, 2020; Ottenhoff, 2011; Papeleontiou-Louca, 2003; Pennock, 2020). Then, some studies stated that the learn-how-to-learn skill is recognized to be a crucial skill for doing effective sustainable learning or lifelong learning (Bryce, Frigo, McKenzie, & Withers, 2000; Cornford, 2002). Therefore, the ability of metacognition that closely relates with learn-how-to-learn skill is noted to be an essential skill for effective lifelong learning.

The term metacognition is first introduced by Flavell in 1979 (Flavell, 1979).

Flavell defined the term as cognitive about cognitive phenomena (Flavell, 1979). This definition is supported by other studies that said metacognition as someone's thinking about his or her thinking (Bassett, 2016; Brick, MacIntyre, & Campbell, 2016; Darling-Hammond et al., 2003; Jaleel & P., 2016; Katz & Detsky, 2016; Lai, 2011; Lavi, Shwartz, & Dori, 2019; Lumpkin, 2020; Mahdavi, 2014; Martín-Loeches et al., 2016; Scott & Levy, 2013; Wright, Fowler, & Greenwood, 2020). More comprehensive, TEAL Center Staff in 2019 said that metacognition ability is an ability to use prior knowledge to analyze and create the strategies for dealing with the given tasks followed by evaluating and reflecting the progress of the given tasks working (Staff, 2019). Ultimately, it could be concluded that metacognition ability is awareness of someone's thinking during thinking of solving the problems.

### *Components and activities*

Metacognition consists of two dimensions which are knowledge about cognition and regulation of cognition that both of them construct metacognitive skills (Bártolo-Ribeiro, Simões, & Almeida, 2016; Harrison & Vallin, 2018; Hashempour, Ghonsooly, & Ghanizadeh, 2015; Henter, 2014; HENTER, 2014; Hong, Vadivelu, Daniel, & Sim, 2015; Latha Lavanya, 2019; Mastrothanais, Kalianou, Katsifi, & Zouganali, 2018; Panaoura & Philippou, 2007; Rahmati & Widowati, 2017; Sekar, 2016). Knowledge about cognition is knowing someone thinking while regulation of cognition means something that guides someone's thinking (Staff, 2019; Young & Worrell, 2018). Specifically, knowledge about cognition consists of three kinds of knowledge which are declarative, procedural, conditional knowledge (de Backer, van Keer, & Valcke, 2012; Herlanti et al., 2017; OZTURK, 2017; Schmitt & Newby, 1986; Schneider, 2008; Schraw & Dennison, 1994; G Stephanou & Karamountzos, 2020; Georgia Stephanou & Mpiontini, 2017; Sutama, Anif, Prayitno, & Sari, 2019; Young & Worrell, 2018). While the regulation of cognition consists of three iterative activities; planning, monitoring, and evaluation (de Backer et al., 2012; OZTURK, 2017; G Stephanou & Karamountzos, 2020; Georgia Stephanou & Mpiontini, 2017). Comprehensively, Schraw and Dennison in 1994 said that this dimension consists of five activities which are planning, information management strategies, comprehensive monitoring, debugging strategies, and evaluation (Schraw & Dennison, 1994). Based on the dimensions of each element of metacognition, the metacognitive strategy could be created. This strategy should accommodate declarative, procedural, and conditional knowledge, as well as planning, information management strategies, comprehensive monitoring, debugging strategies, and evaluation activities.

## Research questions

- (1) How many pieces of literature have been gained to be analyzed in the research topic?
- (2) What are the metacognitive strategies that could be concluded from the analysis results of the selected pieces of literature?

## Methodology

### Research Method

This study used systematic literature review (SLR) as the method. The steps of this method are adopted from the study of Wondimagegn Mengist and his colleagues (Mengist et al., 2020). There are six stages in this research method. The first stage focuses on determining the scope of the study. Then, this is followed by defining search string and having search studies as the second stage. The third stage is selecting pieces of literature that have been gained in the previous step by doing inclusion and exclusion based on several aspects which are including past 10 years of publication, including relevant contents, excluding language courses, excluding non-research papers, and excluding not accessible papers. The two following stages are synthesis and analysis stages. The selected pieces of literature are synthesized to extract the contents that are relevant to the research study. Then, the extraction results are analyzed to conclude the findings. The final stage is publishing the findings of the research study.

## Findings

### Research question 1 – How many pieces of literature have been gained to be analyzed in the research topic?

This research question could be answered by conducting the first up to the third stages which are protocol, search, and appraisal stages. In the first stage, the scope of this research study was defined namely exploring pieces of literature related to metacognitive strategies that have been used as an instruction or instructional design or teaching and learning activities excluding activities in language courses since they have different characteristics with the research topic. After defining the research scope, the keywords completed by using Boolean logic for conducting the second step which was the search step are defined. The keywords and the Boolean logic are "Metacognitive Strategies" AND ("Instruction" OR "teaching and learning" OR "instructional design"). By using these keywords,

142 pieces of literature are gathered from several literature search engines which are Google Scholar, Scopus, PubMed, Taylor, and Francis, and ProQuest. In the next stage, inclusion and exclusion criteria are used for doing the appraisal stage. The inclusion criteria consist of academic papers that have published during the past 10 years and publication that is relevant to the research topic. While the exclusion criteria consist of excluding academic papers that are activities in language courses, non-research articles, and not accessible articles (not open access). By having this stage, 8 pieces of literature are got to be synthesized and analyzed in the following stages. Figure 1 below is the chart that illustrates the above-explained stages.

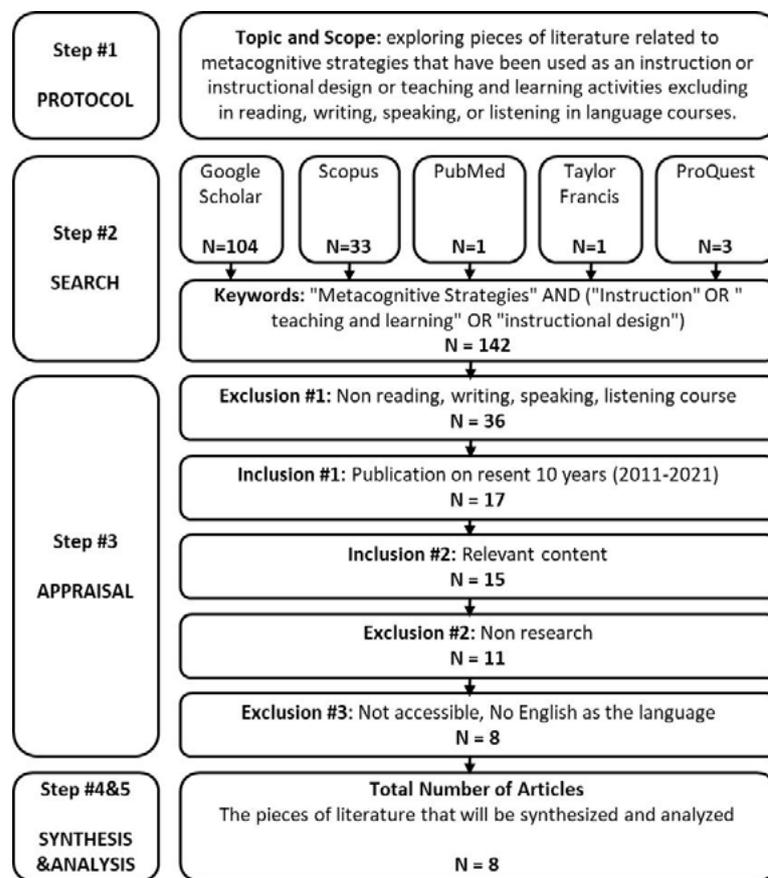


Figure 1. The Stages for Gaining the Pieces of Literature.

**Research question 2 – What are the metacognitive strategies that could be concluded from the analysis results of the selected pieces of literature?**

After getting selected pieces of literature which are 8 pieces, the stages of synthesis and analysis are needed to be done. Table 1 below reveals the results of the synthesis stage of 8 pieces of literature.

Table 1. Synthesis of Selected Pieces of Literature

No	Authors	Year	Extractions
1	(Askell-Williams, Lawson, & Skrzypiec, 2012)	2012	1) select, 2) relate, 3) regulate, 4) check
2	(Aytugba Baraz, 2012)	2012	Reflection papers, case studies, researching the development of the ideas of peers and concept maps (General: 1) awareness, 2) planning, 3) monitoring, and 4) reflection)
3	(Mojarad, Shabani, & AhmadiGatab, 2013)	2013	1) rehearsal, 2) elaboration, 3) organization, 4) critical thinking, 5) self-regulation
4	(Yang & Lee, 2013)	2013	1) read, 2) paraphrase, 3) visualize, 4) hyphothesize, 5) estimate, 6) compute, 7) check
5	(Dogra, 2015)	2015	1) receiving the task, 2) brainstorming the task, 3) making a possible design of solving the task, 4) analyzing the advantages and disadvantages of the design, 5) communicate the results, 6) revise the design
6	(Andersen, 2016)	2016	1) Read and understand, 2) Circle the question and needed facts, 3) Decide on the process, 4) Estimate, 5) Solve and check back
7	(Rieser et al., 2016)	2016	1) planning, 2) monitoring, and 3) evaluating
8	(Copley, Smith, Finch, Fleming, & Cornwell, 2020)	2020	<i>IMPACT</i> => 1) identify the goal, 2) make a plan, 3) predict performance, 4) act it out, 5) check success, 6) try again or tick it out

Based on those results, generally, there are five steps of metacognitive strategies that were in an iterative form which are 1) preparation, 2) planning, 3) monitoring, 4) evaluation, and 5) reflection. Firstly, the preparation stage consists of several elements that are accommodated in the above pieces of literature which are awareness, identify the goal, selection, rehearsal and elaboration, task receiving, reading and understanding, estimation. Secondly, the planning step consists of task relation, organization, make a plan, task brainstorming. Thirdly, the monitoring step consists of task regulation, self-regulation, task checking, task communication, task check back. Fourthly, the evaluation step consists of performance prediction, success checking, critical thinking. Fifthly, the reflection step consists of try again, revision, refinement.

## Discussion

Vocational teachers play significant roles in improving the quality of vocational education. This is mainly because teachers have many duties and become key figures in education (Nielsen, 2010; Van Den Branden, 2016). Vocational teachers are forced to be able to conduct sustainable learning to stay updated with the development of science and technology both in expertise and educational area (Abdullah et al., 2019; Diep & Hartmann, 2016; Hunde & Tacconi, 2014; Nurhadi & Zahro, 2019; Nurtanto, Sofyan, Sudira, Kholifah, & Triyanto, 2020; Subarno & Dewi, 2019). This statement is supported by several studies that said that the most important competency that vocational teachers need to master is the ability to do sustainable learning or lifelong

learning (Arifin et al., 2018; Chakroun, 2019; Chee Sern et al., 2018; Ismail et al., 2018; Mulyadi et al., 2019; Paryono, 2015; Rofiq et al., 2019; Tapani & Salonen, 2019). Therefore, equipping vocational teacher candidates with the ability of sustainable learning or lifelong learning is indispensable.

One of the ways to equip vocational teacher candidates is exercising them with metacognitive strategies in their teaching and learning activities. This is a measure that they will be able to master metacognition ability as the essential competency for conducting effective lifelong learning. In many studies, metacognition is named by learn-how-to-learn skill (Al-jarrah et al., 2019; Bustingorry & Mora, 2008; Chiaburu et al., 2015; Devika & Singh, 2019; Jiménez et al., 2009; Lumpkin, 2020; Ottenhoff, 2011; Papeleontiou-Louca, 2003; Pennock, 2020) and this skill could encourage individuals to be able to conduct effective sustainable learning of lifelong learning (Bryce, Frigo, McKenzie, & Withers, 2000; Cornford, 2002). Ultimately, using metacognitive strategies in teaching and learning activities for vocational teacher candidates could be beneficial for them to be able to conduct effective sustainable learning in their future careers.

Based on the findings of this study, there are five general steps of metacognitive strategies that are in an iterative form which are 1) preparation, 2) planning, 3) monitoring, 4) evaluation, and 5) reflection. These steps need to be elaborated in such a way so that the students will enjoy following those steps in the teaching and learning activities. Integrating technologies in those activities could also help students to be easy to follow the strategies and master the ability of metacognition eventually.

## **Conclusion**

There are 8 pieces of literature that this study has found to be synthesized and analyzed for having insight into metacognitive strategies. There are five general steps of metacognitive strategies as the findings that should be in an iterative form which are 1) preparation, 2) planning, 3) monitoring, 4) evaluation, and 5) reflection. These steps need to be integrated into teaching and learning activities that will help students to be able to master the ability of metacognition that is essential for succeeding in sustainable learning activities.

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# **The talent training model in the Dual University Baden-Wuerttemberg -Concurrent discussion on the reconstruction of talent training model for undergraduate vocational education in China**

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## **Abstract**

The development of undergraduate vocational education has become the focus of China's education reform at the moment, which is both an inevitable requirement for vocational education as a type of education and the improvement of the modern vocational education system, as well as a positive response to the economic sector's need for high-level technical personnel. The Dual University Baden-Wuerttemberg is an application of the "Dual System" model of vocational education in the field of higher education, using a "double-body" education model of school and enterprise. Its application-oriented major settings, modular curriculum system and diversified examination forms combining theory and practice in a competency-oriented manner provide experience for reconstructing the talent training model of undergraduate vocational education in China. Based on the above, China's undergraduate vocational education should set up career-oriented majors according to industrial needs, including strengthening cooperation between schools and enterprises and building a "double-body" education model; establishing an application-oriented modular curriculum system according to career needs; and establishing a diversified assessment and evaluation system with competence orientation.

**Keywords:** Germany; dual university; talent training model; undergraduate vocational education

Die Duale Hochschule Baden-Wuerttemberg in Germany, also known as DHBW, was developed from Baden-Wuerttemberg Vocational School. The term "duale" (dual)

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in its name indicates that the university applies a dual model in higher vocational education, with the university and enterprises acting as dual subjects of talent training. The university has an application-oriented major setting, a modular curriculum, and diversified ability-oriented evaluation methods, which provide useful reference for China to reconstruct its talent training model of undergraduate vocational education.

### **I. Major setting: Driven by economic needs**

Positioned as a vocational school, DHBW offers 28 majors in 4 fields, i.e. health, economics, technology, and sociology, covering over 100 bachelor courses in various directions, in order to pursue its mission of serving regional economic development and training high-level technical talents.

The major setting of DHBW is vastly different from that of traditional comprehensive universities, mainly manifested in the following aspects:

Firstly, application-oriented. Instead of academic criteria, majors in DHBW are established on an occupational basis, where a bunch of highly specialized and practical majors, such as applied midwifery, medical assistance, child and youth assistance, social healthcare management, are established according to different lines of work.

Secondly, interdisciplinary. Economic and technological progress is driving more and more cross-specialization and interdisciplinary industries to emerge across the society, such as digital economy and intelligent economy, putting interdisciplinary talents in dire need. As a result, DHBW has started to establish interdisciplinary majors in recent years, such as digital business principles, digital media, medical informatics, and biochemical technology, all of which demonstrate interdisciplinary features.

### **II. Curriculum setting: A modular system**

Based on its talent training goals, DHBW has established a curriculum consisting of eight types of modules, i.e. core modules, specialized modules, feature modules, fundamental methodology modules, key competency modules, practice modules, degree thesis modules, and additional modules. Each of these modules falls into several specific courses containing no less than 5 and no more than 10 credits, totaling 210 credits.<sup>[2]</sup>

Judging from the courses, the DHBW curriculum demonstrates the following basic characteristics:

- Combination of theory and practice. The curriculum gives prominence to both theoretical and practical study. Each major is set up with three practice and bachelor

thesis modules, aiming to cultivate students' comprehensive ability to apply theory to solve practical problems in field practice. In terms of course arrangement, the curriculum adopts a study plan that alternates between theoretical and practical study.

- Balance between fundamental and specialized study. Each major is set up with core modules, which lay the foundation for the entire curriculum, aiming to teach students the basics of the area and pave the way for their specialized learning. Meanwhile, the curriculum stresses on the training of students' specialized skills by offering specialized and feature modules to help them delve deeper into their areas of specialization.

- Equal emphasis on specialized and cross-specialization competencies. Each major is set up with basic methodology modules, key competency modules, and additional modules. The basic methodology modules provide students with the necessary scientific methodology for carrying out projects and writing theses and cultivate their research skills. The key competency modules focus on training students' capability of teamwork, communication, social responsibility, and international insights in a diversified community. The additional modules normally consist of interdisciplinary courses that aim to cultivate students' ability to solve technical problems from an interdisciplinary perspective.

- Integration of regional and international perspectives. The positioning of DHBW as a dual university, on one hand, means that its curriculum should reflect regional characteristics, so compulsory modules with local characteristics are incorporated into the curriculum. On the other hand, against the backdrops of economic globalization, it has become a core competency for future professionals and managers to acknowledge and understand other cultures. Therefore, DHBW is cooperating with more than 200 universities around the world to provide students with one semester of study abroad, as a way to better prepare them for working in a globalized and integrated world.

### **III. Training model: Dual subjectivity**

The talent training of DHBW follows a "dual" model, with the university cooperating with enterprises to jointly undertake teaching tasks. Education enterprises are among the main subjects of talent training in DHBW, playing an important role throughout the process.

First of all, education enterprises play a dominant role in enrollment. Secondly, during talent training, enterprises will participate in designing study plans and undertaking practical teaching tasks. Thirdly, in terms of funding, enterprises will bear part of the education costs and expenses incurred by teaching practice.

### **IV. Evaluation: Diversified ability-oriented formats and methods**

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According to the examination regulations of DHBW, examinations are conducted mainly by means of on-site testing, term papers, oral examination, specialized report and presentation, practical study reflections, project work, dissertation, and portfolio, etc.<sup>[3]</sup>

Judging from the examination methods and content involved, DHBW gives prominence to the evaluation of students' professional abilities, mainly manifested in the following aspects:

Firstly, on assessing students' ability to comprehend and reflect. On-site testing, for example, consists of questions targeting at knowledge, methodology, and comprehension, allowing students the opportunity to think critically;

Secondly, on assessing students' ability to apply theory to solve practical corporate problems, as with the examination methods such as project work and practical study reflections.

Thirdly, on assessing students' comprehensive problem-solving skills. For example, term papers, specialized reports, and degree theses are all designed to examine students' ability to provide a holistic solution to a problem or task through the comprehensive application of professional expertise.

Fourthly, on assessing students' ability to dabble in multiple specializations. For example, oral examinations, specialized reports, and project work are designed to not only assess students' professional competencies, but also their expressiveness, public speaking skills, and team work.

## **V. Reconstructing the talent training model of undergraduate vocational education in China**

Development of undergraduate vocational education has become a priority of the ongoing education reform in China. This is a prerequisite for vocational education, as a kind of specialized education, to fall into place of the modernized vocational education system in China, and also a positive response to the demand of high-level technical talents in the economic sector.

### **(1) Set up occupation-oriented majors according to industry needs**

The positioning of undergraduate vocational education in China's education system determines that its majors must be set up according to the basic principles of adaptability, applicability, and regionality. Adaptability means that majors must be set based on national development strategies, changes in regional industrial structure, and the latest technological innovation and development. Applicability means that compared with comprehensive and research-oriented universities, majors in vocational schools should directly address social production, service, and

management. Regionality means that the major setting should be tailor-made for the regional economy to serve regional development and address the needs for high-level technical talents of regional enterprises. Vocational colleges and universities in China are advised to conduct research on industries, enterprises, and job markets by means of literature study, field research, and in-depth interviews, so as to understand national and regional economic development policies, industrial development and adjustment strategies, technological innovation and development trends, and the needs for high-level technical talents within industries. The major setting should be occupation-oriented, with priorities given to new cross-disciplinary sectors (such as digital economy and intelligent economy) and the upgrade and transformation of traditional industries (such as equipment manufacturing and electrical and electronic engineering), so as to meet the needs for high-level technical talents within the economic sector.

(2) Strengthen university-enterprise cooperation and establish a "dual-subject" training model

University-enterprise cooperation and the "dual-subject" training model are two typical characteristics of talent training at all levels of vocational education. To ensure the quality of talent training, enterprises have to become the main subject throughout the talent training process. Firstly, the modern apprenticeship system should be introduced into undergraduate

vocational education in China, with pilot programs to be launched in colleges and universities. Secondly, undergraduate vocational colleges and applied colleges are encouraged to cooperate with enterprises in various ways for joint training. Thirdly, colleges and universities should strengthen cooperation with integrated production-education enterprises to establish industrial colleges. University-enterprise cooperation agreements should be signed to clarify the responsibilities and obligations of both parties in terms of major construction, talent training, and faculty development, so as to implement enterprises' responsibilities of talent training.

(3) Establish an application-oriented modular curriculum based on professional needs The vocational and advanced nature of undergraduate vocational education requires the curriculum to break the traditional logic of discipline organization, and instead, be modularized based on the technical know-how required. Such know-how mainly includes the skills, competencies, crafts, and techniques related to hands-on experience; methods, means, and approaches manifested in the ways of doing things; materialized tools, equipment, facilities, and installation; and industrial technology, engineering technology, and modern science and technology.<sup>[4]</sup> Choosing the area

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of expertise as appropriate remains a top priority for constructing the undergraduate vocational education curriculum. This issue can be solved through occupational analysis, which helps identify the areas of expertise. After this, a modular curriculum can be set up by organizing the courses according to the actual logic of teaching practice based on the intrinsic connections between the tasks.

#### (4) Establish an ability-oriented and diversified evaluation system

Firstly, establish ability-oriented evaluation goals. Evaluation goals play a strong guiding role. From an individual perspective, evaluation goals show the direction of learning for the student being evaluated; From a social perspective, they provide guidance on what values should be pursued.<sup>[5]</sup> Traditionally, education evaluation focuses on the assessment of knowledge, while less importance is attached to that of competencies. Since undergraduate vocational education aims at cultivating students' advanced professional abilities, such abilities must be broken down into specific competencies of various subjects and reflected in the evaluation goals when assessing students' academic performance; Secondly, evaluation questions should be designed based on the evaluation goals. The questions should not only assess students' mastery of expertise. More importantly, they should assess their ability to apply such expertise to solve practical problems. Therefore, the questions should be designed through a holistic and comprehensive approach to encompass economic, social, and ecological perspectives. Thirdly, evaluation methods should be chosen properly. In addition to the conventional examination methods, other methods such as project work, reflective reports, and oral presentations should also be selected to assess students' professional abilities, especially their skills of creative problem-solving, self-reflection, oral expressiveness, public speaking, team work, and communication and coordination. Such an ability-orient evaluation system will promote the professional development of students.

# **Exploring Business Lecturers' Perception towards Teaching and Learning Repository in Malaysia Vocational Colleges**

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## **Abstract**

When Covid-19 outbreak attacked the globe in early 2020, teachers reluctantly were forced to shift their teaching platform from the conventional physical face-to-face meetings to online or remote learning. This scenario has hit hard and Business Management teachers in vocational colleges, Malaysia, are also not spared. Because school closures were unexpected and for unknown durations, a lot of teacher groups were formed to develop teaching materials for online learning. While this scenario has helped teachers of the Business Management programme to share and gather materials fast, however, this has resulted in unstandardized teaching and learning materials. Because of the inconsistency of teaching materials among vocational colleges, some doubted the quality of continuous assessment which teachers individually administered in their own college. This leads to the effectiveness of the assessment instruments in measuring students' performance and consequently, the attainment of the course learning outcomes. The aim of the study is to describe the development of the Business Management teaching and learning repository for vocational colleges in Malaysia. Besides, the study will also examine the perception of Business Management teachers towards the repository. A cross-sectional study design was used,

and quantitative data were collected using a structured survey from 280 lecturers out of the population across 47 vocational colleges in Malaysia. A total of 162 respondents were involved as samples. The sampling technique used in this study was a simple random sampling. The study's findings indicate a positive feedback from respondents towards the existence of the repository related to the standard of the materials and content. However, during personal interviews with the teachers, we found that they were initially unprepared for the shift to remote learning. Therefore, the development of the repository has certainly helped their online teaching and learning process. The finding supported the Technology Acceptance Model in this study. Future research is recommended to other business or non-business fields and also the personnel in the Division so that the repository is systematically developed according to some identified pre-set standards in order to make sure that teachers are adequately equipped for future uncertainties and shocks.

**Keywords:** Teaching and Learning Repository, development of teaching materials, teacher's perception, technology acceptance model, vocational college

## 1.0 INTRODUCTION

When the Coronavirus disease 2019 (Covid-19) outbreak raged the globe in the early of 2020, teachers were forced to shift their teaching platforms from conventional face-to-face meetings to online or remote learning avenues. Online learning platform is expected to affect both students' learning and teachers' pedagogy (Kumar, Sarkar, Davis, Morphet, Maloney, Ilic & Palermo, 2021). This scenario hits all educators even in the best set of education in the world, and Business Management teachers in vocational colleges, Malaysia are not spared.

Some teachers have to adjust their lectures to these circumstances immediately and with flexibility (Weidlich & Kalz, 2021). Teachers of the Business Management programme were also fast looking for solutions to solve challenges in preparing online teaching and learning materials. However, the progress has somehow caused unstandardized teaching and learning materials among 47 vocational colleges which offer the program. The issue of content consistency in teaching and learning materials among these colleges is critical because the students will be taking a standardized final examination set by the Assessment Unit at the Technical Vocational Training and Education Division (BPLTV), Ministry of Education Malaysia. Therefore, the inconsistency of content in teaching and learning has contributed to sound questionable quality of continuous assessment instruments which are developed by the teachers in their respective colleges. Inevitably, students' performance and the attainment of course learning outcomes are also in question.

This has created a need to develop technological solutions that organize and facilitate the exchange of such knowledge and materials. In order to solve this problem, the Curriculum Development Cluster in BPLTV took the initiative to create a Teaching and Learning Repository (TLR) through google drive as a support tool as a result of technological advancements (Rahimi & Shute, 2021). Meanwhile, Business Management teachers are able to share resources for teaching remotely with their peers. The TLR can be a great platform for the teachers to ensure the ongoing pedagogy process. The TLR has just been launched by the BPLTV, thus, it is crucial to know the teachers' perception towards the existence and functionality of the repository and find out whether the TLR will ease them in the teaching and learning process in future. Without any intention to dismiss the teachers' touch in teaching, teachers should also incorporate technological innovation in their lessons which will elevate Technical Vocational Education and Training (TVET) and vocational colleges to the next level.

## **2.0 LITERATURE REVIEW**

### **2.1 The development of teaching and learning repository**

During the Covid-19 pandemic, information and communication technology (ICT) has become increasingly important in the educational sector. Therefore, the adoption of a particular technology in a variety of educational settings is crucial for maximizing the technology's usefulness (Dimitrijević & Devedžić, 2021). Regardless of the proclivity of information communication and technology to enhance the teaching and learning process, adoption or rejection of educational technology is critical (Rughoobur-Seetah, & Hosanoo, 2021). The technological acceptance model (TAM) has evolved into a critical model for predicting human behaviour in response to either rejection or acceptance of technology (Granic & Marangunic, 2019). Subsequently, teachers' motivation and operation in utilizing TLR could be substantiated by the Technology Acceptance Model (TAM) of online learning resources. Therefore, Kio and Lau (2017) recommended extending coverage of Technology Acceptance Model (TAM) applications and advises that professional development and government sponsorship in establishing TLR be strengthened. Besides, TLR has a significant beneficial direct effect on perceived usefulness and perceived ease of use (Elfeky & Elbyaly, 2021).

Business Management programme in vocational colleges uses English reference books and for every course, a teacher or student will have one or two references to refer to. It is acknowledged that not all teachers are fluent in English, but most of the time, business reference books are abundantly written in English. This is where some

inconsistency of content translation can happen.

It is the nature of a course to have a few reference books, but not many teachers are able to integrate these few resources into one unique teaching and learning material for that particular course. It gets more difficult if one teacher is teaching more than one course at the same time.

As a result of this research, a TLR was conceived and constructed to aid business teachers in obtaining teaching materials. This learning repository is developed using google sites and it can be accessed from a browser on a mobile phone or personal computer and use the internet connection. Hence, TAM is successfully applied in the development of TLR in order to examine teachers' perceptions towards it.

Teaching and learning repository is a platform which provides resources and materials for teachers of Business Management in vocational colleges. These materials include lecture notes, recorded lectures, presentation slides, activity worksheets, continuous assessment instruments including quizzes, written tests and assignments. The process of developing the TLR is illustrated by the flowchart in Figure 1.

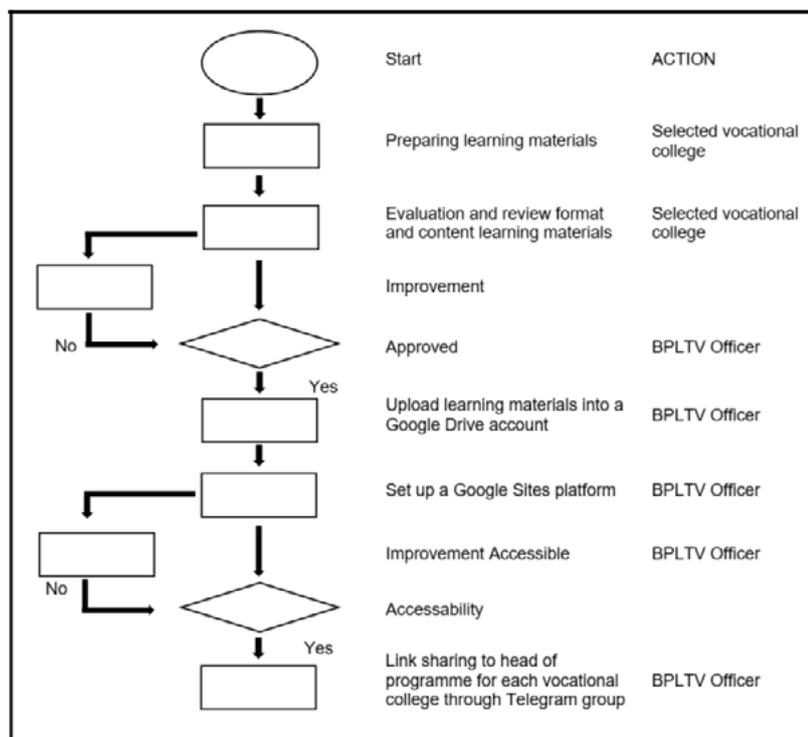


Figure 1 : Flowchart process of development of teaching and learning repository

In Malaysia, there are 47 vocational colleges offering Business Management Programme and 32 main courses to be carried out within two years of study at the certificate and diploma levels. Therefore, the first step in developing the teaching and learning materials is assigning a vocational college to one course, and this selection is done by the officer in charge from the Curriculum Development Cluster, BPLTV.

The leaders are responsible for completing the materials for the predetermined course. Among leaders, they will discuss and agree on the format, structure and the content of the material so that they are in line with the syllabus requirements. Then, each leader will form a team consisting of the subject teachers. This team will prepare the materials within the given time frame before submitting their work to a specific folder in Google Drive which has been created by their leaders.

Once all of the materials have been uploaded, the following step is to review the materials by the group members of each team to ensure that the presentation and content of the materials adhere to the specifications. After the review session, improvisation and changes should take place accordingly. Then, leaders will manage the materials into a few categories depending on their types: notes, slides, videos, worksheets, assessments, marking rubrics, and other references. The organization is to help teachers access the materials more efficiently. Later, leaders will upload these materials to Google Drive which has been created by the BPLTV officers.

The collected teaching materials have been customized to instructional needs of vocational college teachers to serve as resources for them. In order for all Business Management teachers to access the materials, the BPLTV creates an interface using Google Sites for the Programme and all of the teaching materials are shared by embedding the Google Drive link in the created Google Sites.

Figure 2 shows the interface of Google Sites for the Business Management Programme. To use this repository, teachers only need to click on the relevant semesters to obtain the teaching and learning materials from the course folder for the semester (Figure 3). Some of the benefits provided by the repository include content sharing component, organized course content, and standardization of teaching materials. Then, the BPLTV will check the accessibility of Google Sites URL link before sharing it to the teachers.

The URL link will be sent to the 47 heads of Business Management Programme via Group Telegram. It is the responsibility of these heads to inform and spread the news or the link to their subordinates so that all business management teachers could get access to this repository. Besides, the BPLTV also helps disseminate the information through a series of briefings with all of the directors of vocational colleges.

The repository was developed using Google Drive and Google Sites as it is a powerful Web-based application for sharing files that has already transformed the way millions of users communicate and handle online materials. The application allows users not only to store files securely but also to share documents by providing URL links to other users. This feature provides a real-time working experience on a document. In

addition, teachers can easily make copies or save files shared by the URL link to their own drives for later use.

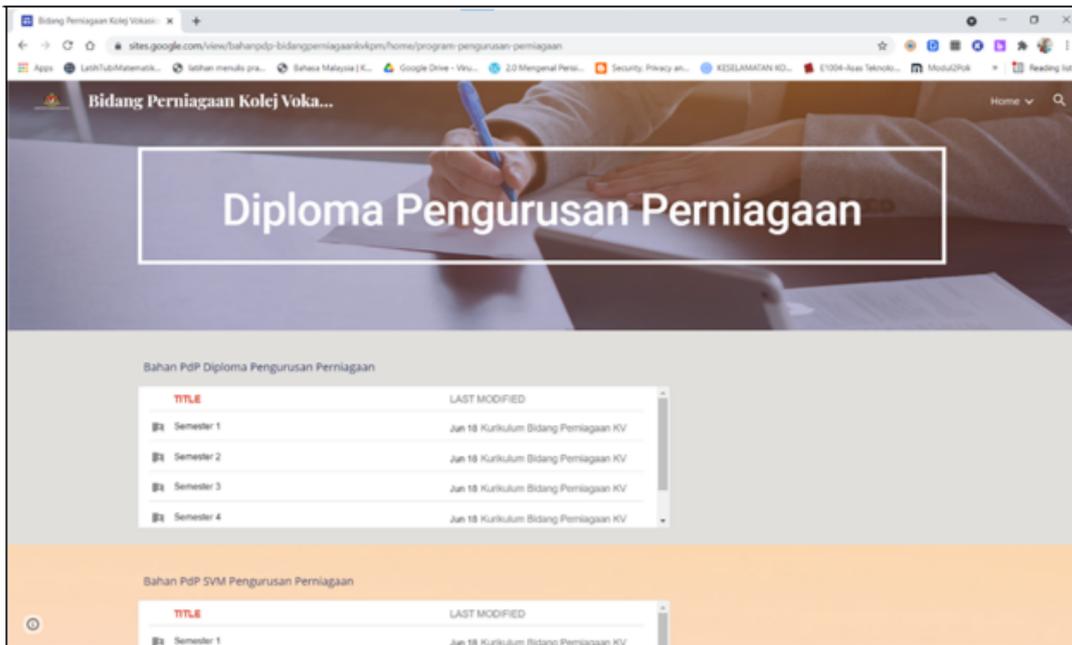


Figure 2 : Interface of Google Sites for Business Management Programme.

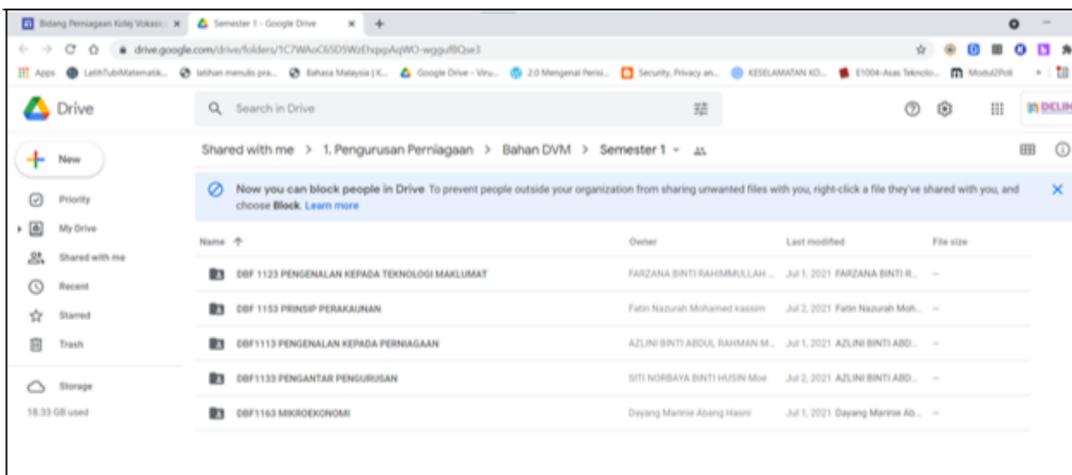


Figure 3 : Course folders contained teaching materials

## 2.2 Technology Acceptance Method (TAM)

The research approach for this study is based on Davis's (1989) TAM, which shows the external (independent) variables that influence users; perceived usefulness (PU), perceived ease of use (PEOU), and attitudes (AT), and indirectly determine the intention (BI) to use technology (the dependent variable). Therefore, this study seeks to determine the factors that influence and contribute to the teacher's intentions to use the teaching and learning repository.

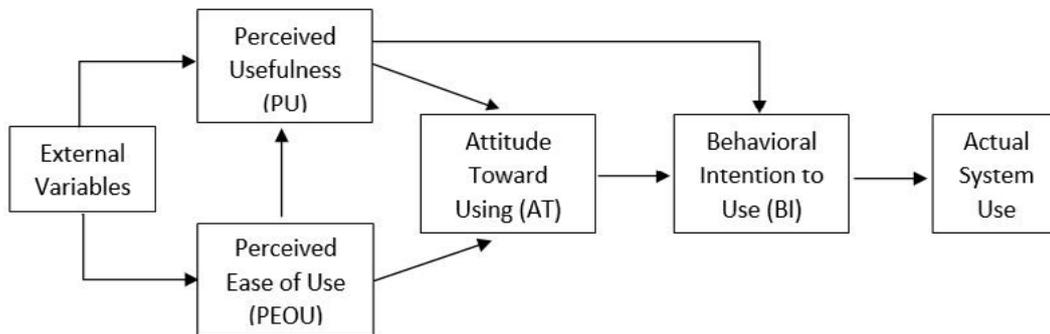


Figure 4: Original Technology Acceptance Model by Davis et al. (1989)

According to TAM, there are two main variables that influence the user's decision to adopt a technology namely perceived usefulness (PU) and perceived ease of use (PEOU) (Hanafi et al.,2019). Perceived usefulness (PU) reflects users' perceptions of how well a technology helps them enhance their work performance, whereas perceived ease of use (PEOU) reflects users' expectations that using technology is simple and painless. Broadly speaking, TAM illustrates that the ease and usefulness of technology perceived by users will increase the positive attitude towards technology (Hanafi et al.,2019).

In recent years, the application of TAM in investigating LMS has become a research trend in the education field. Factors that influenced LMS acceptance showed results in which student's attitudes were directly influenced by perceived ease of use. In addition, the students are generally optimistic about the usefulness of LMS and they tend to be willing to use them effectively (Radif et al.,2016).

TAM has been widely used around the globe to examine secondary teacher acceptance of e-learning. The TAM model can be used to explain factors influencing teachers' acceptance and intention to use e-learning.

### 2.3 Teachers' Perception Toward Teaching And Learning Repository (TLR)

Based on previous research, there are different perceptions from teachers towards TLR. Initially, teachers who have more experience in using TLR were more adaptable and flexible in their use of various resources to overcome challenges (Jung, Omori, Dawson, Yamaguchi

& Lee, 2021). Meanwhile, teachers are pursuing possibilities for individual and collaborative learning and forming new partnerships with a variety of stakeholders (Chaaban, Arar, Sawalhi, Alhouti & Zohri, 2021).

the classroom. Through this TLR, teachers can create, organize, and conduct a variety of creative and energetic activities. Teachers can utilize TLR to update course materials and create new educational spaces that encourage peer participation in the teaching and learning process (Salas-Rueda, Eslava-Cervantes & Prieto-Larios, 2020). TLR was also viewed favourably by teachers in terms of motivation, efficacy, and engagement (Akayoğlu, 2021).

Yanti, Setiawan, Nurhabibah and Yannuar (2018) suggested that teachers regard TLR as a beneficial and also user-friendly technology. It was discovered that teachers are satisfied with the benefits of incorporating this new technology into their TLR. Hence, teachers feel prepared for accessing TLR as it was useful, simple to use, and that they intended to continue using it in the future (Lessa & Von Flach, 2020). However, teachers are more susceptible to unpleasant emotions such as frustration and anxiety (Guerrero-Ortiz & Huincahue, 2020). Without any doubt, the biggest challenges that teachers face are limited internet access and network availability (Widarto, Sutopo, Nurtanto, Cahyani & Honggonegoro, 2020). Besides, they complained about the high workload (Baranova, Kobicheva, & Tokareva, 2021). In order to enhance the system's effectiveness and foster commitment to remote learning (Emelyanova & Voronina, 2014), teachers' perceptions of various aspects of TLR must be taken into account while.

### **3.0 RESEARCH METHOD**

#### **3.1 Research Design**

The data for this study collected both quantitative and qualitative data from all participants. This data collection technique will aid the researcher in gathering accurate data, reducing bias, and improving the quality of the data obtained (Creswell, 2012; Sekaran, & Bougie, 2010). This research was carried out at 47 vocational colleges in Malaysia. Based on the prior literature study, a survey questionnaire was modified. In addition, a phone call interview session was carried out with 10 lecturers in order to obtain lecturers' perception towards teaching and learning repository so that in-depth information will be collected.

### **3.2 Research Sample**

This study used convenient sampling to collect 162 survey questionnaires from vocational college lecturers through online surveys by using a google form. Respondents completed survey questionnaires on a voluntary basis.

### **3.3 Research Instruments**

This study's instrument consists of quantitative and qualitative data from the respondents. Quantitative instrument in this study is a series of questionnaires with 29 study-related questions that were delivered to respondents to elicit the appropriate responses. The questionnaires were divided into three sections (A, B and C). Part A consists of 7 questions on demographic information while part B consists of 16 questions on standards for materials, and part C consists of 6 questions on standards for content which were adapted by Bahadır Tuncer (2020). This set of questionnaires showed the score for five Likert scales from 1 (Strongly Disagree) to 5 (Strongly Agree). Researchers performed a pilot study on 30 lecturers to ensure the developed instrument's reliability in meeting the requirement. Cronbach's Alpha reliability coefficient is high at 0.960, according to the results of the study. As a result, the researchers determined that the adopted questionnaire is suitable for use in the actual study.

Besides, qualitative data was collected from the respondents through a phone call interview that reveals the lecturers' perceptions towards teaching and learning repository. The questions are as follows:

- a) What do you think about the teaching and learning repository?
- b) Is it helpful? State your reason.
- c) Do you prefer the teaching and learning repository in a single medium of language? State the medium of language.
- d) What is your suggestion to improve the teaching and learning repository?

### **3.4 Data Collection**

The survey elicited responses from lecturers at vocational colleges in Malaysia. Before proceeding with the survey, which took approximately 15 minutes to complete the online survey at their own pace, each participant has provided informed consent. The Education Planning and Research Division (EPRD), Ministry of Education, Malaysia approved all methods and procedures.

### 3.5 Data Analysis

SPSS version 23.0 (Statistical Package for the Social Science) was used to analyze the questionnaire data. The mean was determined using descriptive analysis to determine the lecturers' perception towards the repository in vocational colleges.

## 4.0 RESULTS AND DISCUSSION

The questionnaires were answered by a total of 162 lecturers. The table below summarises the analysis of the results.

Table 1. Respondent's demographic (Part A)

Demographic	Factor	Frequency (f)	Percentage (%)
Age	Less than 30 years old	44	27.2
	31-40 years old	53	32.7
	41-50 years old	44	27.2
	51-60 years old	21	13.0
Races	Malay	127	78.4
	Chinese	9	5.6
	Indian	8	4.9
	Others	18	11.1
Sex	Male	57	35.2
	Female	105	64.8
State (Based on Institution)	Pulau Pinang	22	13.6
	Kedah	23	14.2
	Perlis	1	0.6
	Perak	8	4.9
	Kelantan	12	7.4
	Negeri Sembilan	17	10.5
	Pahang	11	6.8
	Johor	2	1.2
	Melaka	16	9.9
	Sabah	16	9.9
	Sarawak	14	8.6
	Selangor	11	6.8
Terengganu	5	3.1	

	Wilayah Persekutuan Labuan	4	2.5
Academic Profile	Bachelor	143	88.3
	Master	19	11.7
	PhD	0	0
Teaching Experiences	Less than 10 years	87	53.7
	11-20 years	43	26.5
	21 years above	32	19.8
How frequent do you access the repository?	Never	25	15.4
	Occasionally	27	16.7
	Sometimes	75	46.3
	Often	23	14.2
	Always	12	7.4
		162	100.0

Table 2. The result of the standard for materials (Part B)

	Item	Mean Score	Standard Deviation
1	Materials are functional.	3.99	.579
2	Materials are accessible easily.	4.10	.602
3	Materials are related to the syllabus.	4.02	.589
4	Materials comply with lecturers' interests and needs.	3.97	.594
5	Materials are flexible.	4.04	.545
6	Materials are useful.	4.20	.536
7	Materials are prepared for reinforcements.	3.80	.676
8	Materials are suitable for developing students' creativity.	3.69	.673
9	Materials are designed to be used easily.	3.97	.528
10	Materials support effective learning.	3.97	.528
11	Materials help the teaching and learning process.	4.08	.486
12	Materials have a user's manual.	3.51	.813

The empirical test shows that the lowest mean was for the question “Materials have a user’s manual.” (mean = 3.51, s.d.=.813), this indicates that the lecturers realized that the officer from the TVET didn’t prepare a precise user’s manual for the lecturer. On the other hand, the question with the highest mean, which is (4.20), the standard deviation is .536 and the question is “Materials are useful.” (Table 2).

Table 3. The result of the language for materials (Part B)

Aspect	Factor	Frequency (f)	Percentage (%)
Language	Malay	104	64.2
	English	6	3.7
	Bilingual	52	32.1
		162	100.0

Based on Table 3, the data for the language for materials showed that a total of 104 (64.2%) lecturers prefer the Malay language compared with 6 lecturers (3.7%) and 52 lecturers (32.1%) prefer English and Bilingual respectively. Therefore, the findings of the data analysis obtained can be said that the majority of respondents prefer the Malay language. This indicates that the lecturers were able to dominate the courses easily and enhance the efficiency of the instructional process towards students' understanding in their learning process.

Table 4. The result of the standard for content (Part C)

	Item	Mean Score	Standard Deviation
1	Content is up-to-date.	3.63	.747
2	Content is appropriate.	3.73	.628
3	Content is supported with reference books.	3.78	.762
4	Content adheres to Course Learning Outcomes.	4.04	.599
5	Content is useful in the teaching and learning process.	4.11	.511

The empirical test shows that the lowest mean was for the question "Content is up-to-date." (mean = 3.63, s.d.=.747), this indicates that the lecturers disagree that the content of the material is not the latest version. On the other hand, the question with the highest mean, which is (4.11), the standard deviation is .511 and the question is "Content is useful in teaching and learning process." (Table 4).

In the meanwhile, among 10 lecturers who were interviewed, the researcher realized that all the lecturers responded that the repository is an appropriate method used by vocational colleges' lecturers to obtain teaching and learning material and contribute to their teaching and learning material in order to coordinate and standardize course notes to be used by all the vocational colleges. Besides, the majority of them responded that TLR is very helpful, easy to access and easy to find materials for additional references as well as helps the lecturers to develop their continuous assessments. Most of the materials are in Malay language which may help the lecturers to maneuver

their courses easily because all the main references for the courses are all written in English. In terms of the language used in TLR, six of the interviewed lecturers were having the same thought which is bilingual whereas four lecturers preferred the Malay language. In future, the lecturers recommended that TLR should be improved in terms of its accessibility control, so that the materials in the repository are in good condition and well organized. In addition, diversification of the materials in TLR is highly encouraged such as exercises, continuous assessment questions, rubrics, videos, slide presentations to enhance digital learning.

## **5.0 CONCLUSION**

Overall, this study attempts to describe the development of the Business Management teaching and learning repository for vocational colleges in Malaysia. Besides, the study will also examine the perception of Business Management teachers towards the repository. The findings show that the majority of the lecturers are highly satisfied with the Business Management teaching and learning repository in terms of the standard for materials and content. The implication of study is the findings could give a reflection to the authority to improvise the repository. In the future, researchers may extend the study by including other business courses like accounting, marketing, insurance, banking and retailing in order to get the overall picture for the effectiveness of the repository.

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# **Awareness about 10R Practices through Malaysian Technical and Vocational Education and Training (TVET) Programmes in Achieving Industrial Revolution 4.0**

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## ***ABSTRACT***

Sustainable Development (SD) through recycling can minimize waste quantity on land, provide raw materials availability, conserve and preserve the environment for future generations by proactive citizens' participation in global recycling programmes. The transition from Industrial Revolution 4.0 (IR 4.0) to Industrial Revolution 5.0 (IR 5.0) requires intervention through Malaysian Technical and Vocational Education and Training (TVET) programmes. TVET provides a formal, non-formal and informal learning platform for global skilled human capital development. Manufacturing automation with current industry 4.0 technologies enables resources to go through 10 R processes, namely Refuse, Rethink, Reduce, Reuse, Repair, Refurbish, Remanufacture, Repurpose, Recycle and Recover optimum resources utilization. Besides that, green practice skills have also been added as crucial in managing renewable energy, waste prevention, disassembling and recycling materials. To apply effective greening initiatives, manufacturing and supply chain companies must adopt greening measures

through the practical green framework, policies, practices and TVET programs for an inclusive economic growth. The TVET curriculum also plays a significant role in producing a green labour force by raising awareness program through teaching and learning practices that involves all stakeholders. This study focuses on connecting green skills, green technology, and green purchasing with 10 R practices. The relevant and literature review is adapted through secondary data collection for this study, from previous researches, journal articles, seminar proceedings, conference papers, journal articles, online resources and reference books. This review article is expected to identify the focused strategies and barriers in implementing 10 R practices through TVET programmes.

**Keywords:** *Sustainable development, Recycling, TVET programmes, Green Skills, Green Technology, Green Purchasing*

## 1.0 Introduction

Recycling is a practice that needs to be carried out for sustainable management of solid waste through the unavoidable product of urbanization, agriculture, E-waste, and others due to household activities. Therefore, recycling can benefit the community and the environment by collecting and processing materials trashed and transformed into new products for several benefits. Recycling can trim down the amount of waste being sent to landfills and incinerators to prevent pollution. This practice preserves natural and valuable resources and improves economic security by penetrating domestic material sources (EPA, 2020). Hence, recycling enables the creation of new jobs in dealing with manufacturing industries which can be integrated through Technical, Vocational Education and Training (TVET). Recycling has taken the latest approach through new "Rs" of sustainability as presented via Table 1.

Table 1: The New "Rs" of Sustainability and Descriptions.

No.	The New "Rs" of Sustainability	Description
1.	Reduce	Cut down daily use materials amount
2.	Reuse	Using the material again for other usages
3.	Refuse	Reuse wasteful products such as computer printouts
4.	Recycle	Collecting and processing materials for new product transformation
5	Repair	Work on the recyclable item to ensure it is intact.
6.	Repurpose	Creative ways in transforming the wastage as for a new function
7.	Remanufacture	The industrial process to rebuild a product from its previous specifications being non-functional to functional
8	Rethink	Think before purchasing and recycling
9.	Recover	Waste that uses to energize other aspects of life
10.	Refurbish	Use recyclable items productively by refurbishing them.

Abd' Razack et al. (2017) indicated that lower-income households recycle their waste compared to higher-income households. Recycling habits among lower-income groups are seen with greater afford in preserving the environment based on collaboration with municipal solid waste management with benefits on cost and resources conservation, monetary reward, and environmental awareness in sustainable practices. Kumar et al. (2017) highlighted that besides household waste, E-waste is also growing rapidly and has environmental impact due to its hazardous chemical content, which needs to be disposed of systematically in proper recycling facilities. E-waste components consist of electrical and electronic equipment such as smart TVs, handphones, laptops, computers, and others that should not result in the landfill.

### **1.1 Environmental Benefits of Recycling**

Zhang et al. (2018) studied the recycling of construction and demolition of buildings for reduction of greenhouse emission and landfill usage. The author also stressed that this kind of recycling has the most significant potential and can change policy, the implication for the secular transition of urban areas. Supported by Lockrey et al. (2018), construction and demolition waste management through technological advancement, transparent policies, responsibilities, and activities coordination among key stakeholders promotes more significant benefits in construction life cycle inventory development. Moazzem et al. (2021) explained that recycling integration provides more significant environmental benefits and impact reduction. Turning the

recyclable textiles materials into value-added products is economically feasible to generate income. Sandin and Peters (2018) stressed that textiles reuse provides more significant benefits than recycling. The reuse of textiles enables the production of new products to be controlled, and the resources are not wasted unnecessarily.

## 2.0 Sustainability Development Practices in TVET

Call for actions in the global environment to seventeen sustainable development goals been developed by The United Nations concerning water, energy, urbanization, climate, ocean, transport, science and technology. Global partnership is required to achieve these goals to end poverty and provide a better environment with more outstanding education and resources available for the current and future generations. The following discussions are about the approaches to achieve those goals. Mustapha (2015) indicated green transition is needed through recycling and reuse as a part of sustainable transformations and low carbon world achievement by reducing emission, enhancing higher productivity and inclusive growth in producing green professionals through green TVET. Therefore, more significant investment, innovative plans and strategies need to be created to develop a green lifestyle and quality and competent human capital.

### 2.1 Green Skills and Practices in TVET

Zolkifli et al. (2016) refer to TVET as formal institutions educational activities implemented for knowledge, technical and specialized job skill acquirement in the era of globalization and rapid technological development. The author relates generic green skills as needed for environmental sustainability to promote green practices. Green practices are integrated with recycling, reusing, and reducing activities in the industries. An appropriate training program is provided for the workforce enhancement to develop competent workers with green skill adaptation. Rodzi (2019) analyzed the generation and composition of municipal solid waste in Malaysia TVET campus and categorized the ways into six components of organic/ food, plastic, metal, paper, glass, and others. The author found that most waste is from organic or food classification due to cafeteria operational activities and recommended food waste composting, educating and systematically segregating waste recycling bins provided in the vicinity and rewarding or merit or penalty enforcement is implemented to manage this matter effectively.

Zubir et al. (2020) mentioned TVET green skills need to be practised in teaching and learning processes. Highlighted pure green values, environmental care, recycling habits, reduced carbon consumption, reuse used waste and disposal of practical waste in the right vicinity among the aspects stressed through this study.

Therefore, extensive teaching and learning guidelines for educators had to be created to meet the need of the industries to improve the quality of work. Kamis et al. (2016) clarified green skill elements adding value to design and technology cross-curriculum elements. Green jobs require knowledge and skills to enhance green economic and public awareness through curriculum development, training, education, teaching and learning processes and coaching sessions to develop renewable and disposable energy sustainability.

Abd Hamid et al. (2019) explained green-collar employee equipment with specific generic green skills is pioneering to penetrate green job market for future workforce employability. The authors stressed innovative practices while delivering lectures through e-learning implementation and at the same time awareness in saving electricity relating reduce of energy utilization while teaching and learning process is taking place. QR codes utilization in recording students' attendance for lectures reduce paper works drastically. Therefore, green education requires training programs in the educational reformation in higher learning institutions. Kamis et al. (2018) refined the importance of green technology for green practice in daily activities connected to daily utilization of energy-efficient electrical appliances, public vehicle use, alternative fuels used, saving water and making wise choices by recycling waste enable the reduction in the garbage disposal.

Children trained from a young age to the higher educational institutional level can prioritize green practices, love the earth, and commit to reducing pollution by conserving resources and energy. Ismail et al. (2017) identified that environmental awareness is one of the crucial skills in developing green skills integrated with 21<sup>st</sup>-century skills. This skill is to ensure ecological assets is preserved with care. The recycling program has been highlighted in promoting awareness through environmental education. Baghbanpourasl et al. (2017) studied green technical and vocational educational curriculum designed based on microenvironmental policies, internship standards through teachers' participation, green labour market relationships with green economic principles that match learners' characteristics green employment professional qualification.

## **2.2 Green Technology in TVET**

According to Akhtar and Akram (2021), green technology in TVET is essential in improving the quality of life by greening pillars for TVET professionals. The authors emphasized green technology adaptation in greening TVET concepts can prepare future workplace human capital. Kamis et al. (2017) highlighted the integration of green campus, green community, green curriculum, green culture, green technology and green research for sustainable development in a TVET educational institution. Learners' participation in Green TVET can adapt necessary skills for

recycling based on environmental, economic, social and cultural sustainability. Ismail et al. (2018) emphasized recycling practice importance among one of the higher learning institution civil engineering faculty successful generated incomes through recycling activities. Besides generating income simultaneously, they managed to save the campus environment and look into the respective parties' involvement in carrying out an effective recycling system adaptation in the faculty.

Mustapha et al. (2019) also studied green technology awareness as a core technology in the fourth industrial revolution, power by renewable energy that minimizes any form of waste. High green awareness through the integration of green technology to sustain a healthy environment is highlighted in this study. Learners' attitude towards the environment and practice of recycling waste reflects a positive attitude whereby they are interested in protecting the environment by recycling the waste. Further government intervention, proper training, and collaborative strategies between stakeholders can promote the adaption of green values and technologies in daily life. Jasmi and Kamis (2019) also emphasize environmental conservation awareness has to be nurtured since childhood through green technology application as a component of sustainable development education driver in rectifying and overcoming environmental issues, thus preparing the nation for the future generations to live in a cleaner environment, greening TVET is a need in promoting revolutionary education, social learning, appropriate energy use and personal resources management for green economic development.

### 2.3 Green Purchasing Practices

Green purchasing is becoming an economically impactful practice, enhancing organizational effectiveness, efficiencies, lowering its expenditures, and being competitive compared to its direct competitor. The operational cost is usually high when the organization does not implement green purchasing (University of Nebraska Omaha, 2014). Green purchasing implementation in the organization can slash costs in handling dangerous materials, operations, disposal of unwanted hazardous solid waste, repairing and replacing the materials that can be lasting, investing in employees' safety and health procedures, and planning materials and energy usage effectively and efficiently. Besides, improving market positions is vital to serving customers with environmentally friendly products and services, enhancing the organizations' ability to capture competitive advantages. Green purchasing complies with environmental-related regulations and can be applied easily. Organizations develop positive public relations and good images when green purchasing for sustainable operation and best business practices (STOPWASTE, 2020). This matter was also confirmed by Wu (2016). SMH just initiated green purchasing practices by implementing Reduce, Reuse, and Recycle actions in daily operational activities.

### 3.0 Analysis

Based on the secondary resources analysis, this study's secondary data collection, from previous research, journal articles, seminar proceedings, conference papers, journal articles, and online resources. The 10Rs practices related to green skills and technology integration in the green economy by reducing solid waste would mitigate global warming. Resources can be saved gradually when these practices are instilled and applied from a young age to value the importance of preserving the environment. TVET through practical knowledge sharing and activities in promoting green skills and technology for effective integration of 10Rs in new sustainability. Keramitsoglou and Tsagarakis (2018) encouraged the public to design recycling bins to expose, guide, and change waste management practices so that they will be aware of the recycling activities. A reward phrase on the recycling bin lid such as thanks promotes, facilitates, and encourages recycling among the public community. They can identify the recycling items with the recycling bin colour that must be matched for effective recycling performance. Ravindra and Mor (2019) emphasized that training in handling E-waste is vital to reduce hazardous chemical exposure, eventually leading to adverse health effects if poor working conditions persist in E-waste disposal areas. The authors also suggested collection of E-waste should be enhanced for sustainable recycling.

Mohamad et al. (2015) stressed that global awareness is vital to protect the environment, especially in construction industries, by minimizing the negative impact of reducing global warming. They have added that green procurement has the characteristics to engage the green, eco-friendly or sustainable products and materials to obtain sustainable development for future generations. Figure 1.2 shows that green project performance is directly related to the project and green account whereby its ability to reduce greenhouse emissions, pollution level, adopt reuse, renewable, reduce, reuse, and recycle throughout operational activities. This effort provides benefits for the environmental, economic, and social aspects. Besides, the client's satisfaction is projected as the green procurement subsequently enhances its reputation and good image.

FIGURE 1.2 GREEN PROJECT PERFORMANCE



### 4.0 Conclusion

Green skills, green technology, and green purchasing benefit everyone through 10Rs practices in reducing solid waste, protecting natural resources, improving climate changes, and decreasing pollution towards the achievement of Industrial Revolution

4.0. These efforts subsequently enhance the well-being of society in the long run. Adopting green technologies may be challenging initially; however, continuous effort is needed to improve environmentally friendly performance for organizational effectiveness and efficiency. TVET institution sustainability by practising recycling of materials, including stationery, water, carpet and others. Energy management can be obtained by installing energy-efficient LED lighting within the institution-building vicinities for comfortable teaching and learning activities. Whilst installing solar power spots and street lights around the building and non-building setting. However, partnership and intervention among all stakeholders need to achieve this effort for inclusive economic growth.

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Awareness about 10R Practices through Malaysian Technical and Vocational Education and Training (TVET) Programmes in Achieving Industrial Revolution 4.0

**BACK**

# **Facility Management Integration through Technical and Vocational Education and Training (TVET) Programmes towards Global Society Creation**

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## ***ABSTRACT***

Facility Management (FM) integrates people, place, process and technology while maintaining and optimizing facilities. Competencies in FM through Technical and Vocational Education and Training (TVET) programmes are enormous as not limited to operating and maintaining buildings and machinery. Scope of FM also covers the curriculum, instructional content, instructional aids, tools and equipment related to TVET programmes. Quality of skills and competencies through FM integration can develop a globally qualified workforce, which can be achieved with TVET practical education. In addition, with the technological revolution, FM supports sustainable development (SD) by balancing the economics, society, environment, and TVET programmes performance as a whole. State-of-the-art facilities with adequate resources ensure FM delivers effective and efficient services in meeting Key Performance Indicators (KPIs). Technology, incorporated with Facility Management, provides effective and efficient service delivery to stakeholders. Several tools and techniques can be adopted through teaching and learning delivery to meet the needs of TVET learners and institutions. TVET institution has an opportunity to pull lifelong learners to further their studies as vital survival 21<sup>st</sup>-century skills. Identification of

the actions along the value chain activity is also essential to be cost-effective and maximize revenue for the institution. Best practices should be adopted to deliver courses smoothly and excellently without any disruptions compared to competitors. Educators and admin personal with talents become the pillars in the process of teaching and learning, including the information technology personal who engage in developing the system of courses delivery. Effective and efficient energy management adaptation would assist stakeholders, and decision-makers handle uncertain situations well to reduce cost and, at the same time, enhance performance and satisfaction among all parties. This study explores FM integration through TVET programmes in developing the global workforce through a systematic literature review. The findings from this study are expected to identify challenges and prospects in integrating FM through TVET programmes for further in-depth researches.

**Keywords:** *Facility management, TVET programmes, Sustainable development, Global society*

## 1.0 Introduction

The integration of people, processes, place, and technology is undeniable in Facility Management (FM), as highlighted by the International Facility Management Association (2009). The association indicated that people need to be encouraged and motivated to be productive and increase employees' citizenship behaviour and commitment, resulting in stakeholders' satisfaction, especially among stakeholders. Once the people are satisfied and highly motivated, they will create and deliver their best values and practices towards the organization's overall operations. The next element comprises place, which stressed the need for a productive and constructive working environment by adapting the designs such as close and open office flexible concepts, environmentally friendly campus, in the context of higher learning institutions, and other related matters. Various innovative technologies in teaching and learning delivery enhance educators and learners' engagement.

Facility management categorized hard FM, which engages in premises and building management matters, and soft FM, which is related to organizational business support services. Hard FM, unlike soft services, is attached to the premises and directly related to the fabric of the building management. These services ensure the health, safety, and welfare of employees are adhered to by legal compliances. Examples of hard FM are lighting, plumbing, heating, ventilation, air conditioning, building maintenance, fire safety systems, IT networks or server rooms, computer labs, etc. Soft FM related to landscaping, window cleaning, security post-management, waste management, catering, car parking, wireless, fixed, mobile telephony and broadband services, etc. Soft FM makes the workplace a better place to be, either by making it a

more secure, efficient, pleasant working environment and systemic work operations, as indicated in Table 1.1. Hard and soft FM are integrated into the adaptation of FM key roles at strategic, tactical, and operational levels (Petty, 2016). Operational FM delivers services by checking its processes, accepting and administering requests in the service centre, gathering feedback information for continuous improvements, and creating a positive relationship with providers internally and externally (Wiggins, 2014). Besides, creating a pleasant working environment is also essential for smooth work tasks delivery (Bellrock, 2019).

Table 1.1 Elements of hard and soft FM per research by Wiggins (2014).

Elements of Hard FM	Elements of Soft FM
Mechanical systems and services	Wireless, fixed and mobile telephony and broadband services
Electrical systems and services	Car parks
Heating, ventilation, air-conditioning (HVAC)	E-learning platform, plagiarism check
Public Health Services	The virtual and physical library
Control Systems	Online data services (students and staff), computer equipment
Utility Services	Audio-visual equipment
Property Management	Video conferencing
Fabric Maintenance	Stakeholders' services
External areas, grounds and landscaping	General office equipment and stationeries
Lifts	Online, print publications
Security systems (CCTV)	Sports grounds
Fire protection	Office furniture and equipment
Plumbing and sanitary services	Company vehicles
Building Management System	Building services
IT structure cabling	General affairs (security, cleaning & housekeeping services)
Standby power supplies	First-aid and occupational health services

FM strategy can be developed through strategic analysis, solution development, and strategic implementation techniques and tools. Strengths, weaknesses, opportunities, and threats (SWOT) analysis, benchmarking and political, economic, social, technological, legal, and environmental (PESTLE) analysis are categorized to strategic analysis. The maintenance plan, stakeholder, and feasibility analysis can be optimized during the solution development stage. Influential corporate culture and central management authority play significant roles in developing strengths in organizational operations (RICS, 2018). Besides that, the application of technology provides a platform for students to learn boundaryless as access for courses available through a virtual learning platform, especially during the Pandemic Covid-19 crisis. Engagement of learners and lecturers in teaching and learning delivery creates a flexible learning environment through a virtual platform, even though several

challenges were encountered at the initial stage of the transition during Movement Control Order (MCO) in March 2020. Information shared through the virtual platform can be assessed at any point, which provides ease of practice for working learners, ensuring their further allocation possibilities as long as there is an Internet connection.

## **2.0 Facility Management and Connection with Technologies in TVET**

Pitt and Mohd Noor (2008) discussed stakeholder surveys that would provide the current scenario for the FM manager to analyze and evaluate the needs of all organization members, including the students. They also stressed that good FM practice should emphasize service delivery quality, research, training, and future development. According to Kim and Kim (2020), university facilities are categorized into four types, namely research, primary education, attached and support facilities, which are integrated with people, place, process, and technology. The authors added that students' satisfaction based on surveys identified teaching and learning, library, computer training facilities, curriculum, learning environment, self-development, engagement, and students' services crucial in generating revenue.

The importance of technologies in teaching and learning delivery method is unquestionable. Technology in education delivery emerges various approaches with devices to project interactive learning among academic and TVET students, especially life-long learners. Computers, laptops, tablets, iPad, smartphones and any other equivalent devices became vital in engaging students interactively. The local and wide area networks (LAN and WAN) are the backbones of the teaching and learning delivery processes, including facility management and administration tasks carried out effectively and efficiently. The computer lab is equipped with computers installed with Windows 10 Operating Systems and Microsoft Office 2019 application software. Other related software such as Statistical Package for Social Sciences (SPSS) Version 27, Turnitin, Digital Library and online learning platform access is also essential. The tutorial, lecture halls, and auditorium are installed with projectors and complete sound systems for effective lecture delivery.

Artificial intelligence can replace educators in certain conditions, such as auto reply AI chat box, emails and other admin and academic tasks being carried out on a routine basis to provide additional time for them to engage in research and development efforts to upgrade the institution. Besides that, collaborating with AI tools cater for diverse and individualized learning, testing and providing feedback to the students in a short duration to enhance effective learning. Enhanced student learning and engagement through virtual reality (VR) immersion to make the students experience practically via simulation, learn by doing, develop creativity, emotional reaction, virtual learning, and boost adaptation to new technology. Educators can promote learning experiences by collaborating VR technology through TVET

programmes, virtual field trips, high technical training, virtual internship, group learning, distance learning and role-play in teaching processes (Babich, 2019).

An interactive whiteboard, also known as the smartboard, is one of the instructional tools that efficiently carry out the teaching and learning process by a display that engages students' participation (ezTalks, 2020). Besides that, educators can record lessons and activities and deliver them as resources for students' references. Virtual and tactile learners can capture the lessons moments as interactive engagement and group brainstorming can be emphasized via games, texts, objects, and others accessible through Internet access. Social media networks such as Facebook, Messenger, WhatsApp, Telegram, and others can enable students' communication, collaboration, and involvement, especially those who engage in distance learning (Willbold, 2019). Lecture through social media platforms improves online literacy, communication and reading skills. Adequate technology equipment in the institution should smoothly be available to deliver teaching and learning smoothly (Chinedu Eze et al., 2018). Applications such as Zoom, GoToMeeting, Google Meet, Microsoft Teams, and many others can provide opportunities for educators and learners to meet online during their teaching and learning schedules for real-time communication.

### **3.0 Facility Management in TVET**

Abisuja et al. (2017) studied the requirement of Facility Intelligence in higher educational institutions. They suggested Building Information Modeling (BIM) provides a platform to collaborate and improve facilities through stimulation and visualization. The model developed showed users involvement in the building operations, able to provide real-time and genuine feedback for continuous improvement, which enhances the application of technology in decision making. Competitive advantage to strengthen business positions and FM related to the quality of services by emphasizing innovation, human capital, financial, and business strategy to improve the revenue-generating methods for the organization's sustainability in these industries (Abdul Wahab and Kamaruzaman, 2012).

FM is strongly connected to education and the institution's growth through the tools and techniques are applied to achieve the goals, which improves productivity and wellbeing of the organization's human capital and learners (Fadahunsi et al., 2019). Authors added facilities such as audio-visual media, tutorial and lecture halls, computer labs, and other support services to enhance the performance of the higher educational institution. Life Cycle Cost (LCC) and Total Cost of Ownership (TCO) provides measurement in reducing wastages, and sustainable practices applied in all operational services, including teaching and learning delivery, to reduce the cost of operation and maintenance (Alsayyari et al., 2019). Added, these excellent practices improve the utilization of educational infrastructure to deliver the best

learning programs through the e-learning platform and physical learning space. Forum discussions, extracting online materials, and online assignment submission are accessible boundaryless. By identifying ideal practices and methods in delivering services at the best level compared to competitors, provide consideration for improving teaching and learning delivery, including the development of the facilities.

Housekeeping personal should be focused on building cleanliness as their primary goal of the higher learning institutions. Classrooms, offices and restrooms are sanitized and wiped down at the needed areas, empty wastebaskets, high dust, wet mop floor and vacuum carpet as per instructions by the relevant supervisor. Besides that, the housekeeping personal should make sure whiteboards, trays, chairs, and desks are intact conditions all the time. Furniture in the office should be polished whenever in need. Detailed clean sink, commode, and urinals, clean mirrors, walls, and windows sills, replenish soap and tissues, and restroom sanitization also carried out as per schedule.

#### **4.0 Findings and Recommendations**

Environmental guidelines such as good indoor air ventilation for staff, students and visitors could provide comfortable surroundings and good health promotion. Greenhouse keeping practices will reduce pollutants by engaging in health and safety measurements in the TVET institutions. A reliable pest management control contract should be awarded to a reputable company to obtain credible services. This ensures that human quality of life can be enhanced by reducing any potential harm towards human health hazards inflicted by pests. Occupational, safety and health administration personal receive annual training to ensure requirements are being fulfilled to avoid any job-related mishaps. Safety equipment such as fire extinguishers, smoke detection, backup generator, surveillance camera, first aid kits must be installed, and an emergency exit should be visible with a lighting signboard.

Safety training to be provided to all students and staff of the TVET institution to create awareness. Students' access is controlled to computer labs, library, admin office, tutorial and lecture halls, and hostel by providing access cards for entrance and exit. Lighting includes the spotlights and tube lights installed years before the LED was introduced, now being changed gradually. The LED tube and spotlights were familiarized in the TVET institution, which is manually controlled by staff with on-off switches for effective electricity utilization. A controller controls six tube lights at a time, and the lights are being turned off during lunch break from 1 pm to 2 pm, scheduled accordingly. Computers are being shut down when the staff is leaving the office at 5.30 pm. Photostat machines that include printers and scanners are automatically activated in sleep mode while not in use to save energy.

The work shift for administration would be from 8.30 am to 5.30 pm whereas for academic staff their working hours are more flexible. The objective of financial management is to allocate the funds effectively and efficiently. The procurement supplies are purchased based on the request made by the admin and academic team. Fleet maintenance should include identifying mobile equipment, special purpose equipment and routes of the vehicle being tracked down in a logbook for control and services purposes. Energy management needs had discussed through publication by UIC (2016). Smart energy management system applied in TVET institution highlighted in the publication. Costs reduction, with operational effectiveness and efficiency, should be enhanced. Energy storage systems adaptation eventually save fuel, improves energy storage and substation peak power utilization. Energy can also be saved through improving HVAC elements' insulations and regulations in the institution. Mardani et al. (2017) reviewed several research articles about sustainable energy management and identified that political, economic, social, technological, environmental, and legal factors in implementing and handling challenges influences the effort.

Hannan et al. (2018) stressed the Building Energy Management System (BEMS) adopted to properly monitor and control a particular building's energy requirement and efficiency in daily activities implementation. They transformed sustainable building energy management by integrating with the Internet of Energy (IoE), which enhances better storage systems, materials, renewable sources, and routers usage. Service personnel must provide training to strengthen their ability to fulfil the stakeholders' needs and requirements. The focus should be on developing team spirit by a good leader who projects leadership skills and leads by example. Every request should be processed within a short period, and feedback needs to be provided to obtain stakeholders satisfaction. This matter can be achieved by improving communication methods with stakeholders through email, WhatsApp, feedback form, Facebook, Instagram and many others.

## **5.0 Conclusion**

According to Dubey et al. (2013), meeting product standards is essential in green purchasing applications. Suppliers who engage in green procurement must be identified to meet those standards to reduce the negative environmental impact. Globalization provides opportunities for the business to learn from other countries such as Japan about green purchasing applications. Authors added that Toyota's invention in hybrid and fuel-efficient cars make one significant contribution to the automobile industry. The creation of the environmental product had been a pioneer for the rest of the automobile industry to adopt green purchasing and green technology. Ezani et al. (2018) mentioned that green procurement is still early in the Malaysian construction industries for sustainability FM practices, especially in higher learning

institutions. Project implementation sustainability is directly connected to increased costs as the practice is always at the initial stage. However, the green procurement actions need to save the environment, human well-being, ecological consent for sustainable development and create awareness among society as the broad aspect.

Faculties can measure the performance of institutions', departments' and academic staff's excellence and achievements during their service. For example, FM staff skills development can be achieved through various training programmes. Facility management staff can be engaged in training related to building inspection and facility maintenance. Commitment provided by all stakeholders ensure smooth operation be carried out in educating stakeholders. However, it is a challenging process but vital to improving the institutional image and reputation, including the facility management department's operations. Team building and cross-team discussion improved commitments and participation in completing projects by attending meetings, moving on in the same direction, achieving productivity, and maintaining quality. Vice-Chancellor Office, finance department, human resources, government relation office, registrar department, admission and record unit, academic unit, examination unit and students' affairs department, facility management, public relation office, marketing and sales, computer centre, library, counselling centre, faculties and research centre are involved in the collective commitments in global society creation.

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# **Vocational and Career Education through “the Public-Private Partnership” in Charter Schools**

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## **Abstract**

The purpose of this study is to examine the practices of vocational and career education in California charter schools, based on the data collected by fieldwork. Especially, this study focuses on how charter schools use the resources provided private organizations for vocational and career education considering “Public-Private Partnership (PPP)”(Gopalan,2013). Especially, this study focuses on how charter schools use the resources provided by Charter Management Organizations (CMOs) and Career and Technical Student Organizations (CTSOs). Charter schools tent to be opened and operated at the areas which has socioeconomically difficulties, and students are facing low achievement or inappropriate educational environment and they are not able to imagine/design their career. This study will discuss about the contribution and issues through the data of California charter schools and then reveals how CMOs and CTSOs influence students’ achievement or vocational and career education. The following are the findings.

1)With the relations with CMOs and CTSOs, Charter schools develop better vocational and career educational plans and promote professional skills by providing them rich resources. CMOs and CTSOs are important contributors to training and development, particularly in low economic areas.

2)In order to develop higher educational services, these schools are able to share their autonomous lessons or educational experiences with other charter schools under the huge network created by CMOs and CTSOs.

3)However, there exist hierarchical relations or power structures between charter schools and CMOs that influence decision-making, personnel management, and school operations in their entirety. Even though the charter school system is established against the inefficiency of public school system run by public bodies, CMOs operating charter schools is seen as another school governing system.

4) Moreover, the relationship between CMOs and CTSOs are highly complicated. As the result, inefficient school operation system might be generated.

Key words: charter school, CMOs, public-private partnership, career education

## 1. Introduction

The purpose of this study is to examine the function of the network between charter schools and charter management organizations (CMOs) and the contributions of Career and Technical Students Organizations (CTSOs). CMOs are non-profit organizations that establish, operate, or support charter schools. Since this trend is akin to the privatization of education, this study discusses the impact of privatizing education by considering the charter school network, especially in vocational and career education, under CMOs. In 1991, the Minnesota State legislated for the creation of charter schools. Although charter schools are public schools, they are not restricted by public entities such as the state, county, or even school district (Nathan, 1996). Easing the regulations on charter schools has made CMOs key players in sharing better educational practices and providing various resources through the charter school network, such as curriculum development, class instructions, and personnel management, and in improving the learning environment (Ravish, 2013).

In addition, CTSO is one of the organizations that is an extracurricular group for students in career and technical education pathways to further their knowledge and skills by participating in activities, events, and competitions. According to National Coordinating Council for Career and Technical Students Organizations, career and technical education is the practice of teaching specific career skills to students in middle school, high schools, and post-secondary institutions.

This study will discuss the function of PPP based on the practices of charter schools operated by CMOs and the services of CTSOs.

## 2. Charter Schools and Charter Management Organizations

As mentioned above, Minnesota legislated charter schools in 1991. Since then, the number of charter schools has increased, and there are now more than 3 million students attending nearly 7,200 charter schools in the U.S (the National Center for Education Statistics). One of the most remarkable traits of charter schools is that they are free from many regulations of states, school districts, or counties. Although charter schools are public schools, they can improve or promote their educational practices (for example, school mission or goals, curricula, personnel, class-size, and teaching materials) with their responsibilities, so charter schools are seen as “hybrid schools

of public and private” (Robertson et al., 2012). One of the traits of charter schools is free from public entities. It means that they are able to operate by themselves and obtain highly autonomy among whole school operation. According to Wohlstetter et al. (1995,2004), the autonomy of charter schools is defined as 1)Free. 2) School-based decision making. 3) Different. 4) Innovative.

On the other hand, CMOs are non-profit organizations. They provide various forms of support to charter schools as professional organizations for school management, curriculum development, or fund raising. In many cases, charter schools face difficulties in school management or financial risk due to a lack of support from public entities (Ferguson, 2012; Lake, 2010; Finn et al., 2000). Many CMOs were created in order to replicate educational approaches. Attracting substantial philanthropic support, CMOs charter schools have grown rapidly in the past decade. Some of these organizations have received laudatory attention through anecdotal reports of the achievement results.

Some of the roles of CMOs are the same as those of the school district in the past. However, with the tide of privatization of education in the 1990s, CMOs have increased, and students’ achievement in charter schools run by CMOs tends to be better than in other public schools. The framework of CMOs and charter schools is shown in Figure 1. As expressed above, the state or school district authorizes or oversees CMOs as charter school operators. On the other hand, CMOs have to show sufficient results or fiscal conditions. CMOs operate and control charter schools (in California, at least three charter schools). Each charter school must meet the requirements of state standard testing or accomplish their own school goals; thus, CMOs must share better educational practices in their charter schools in order to improve their schools’ quality.

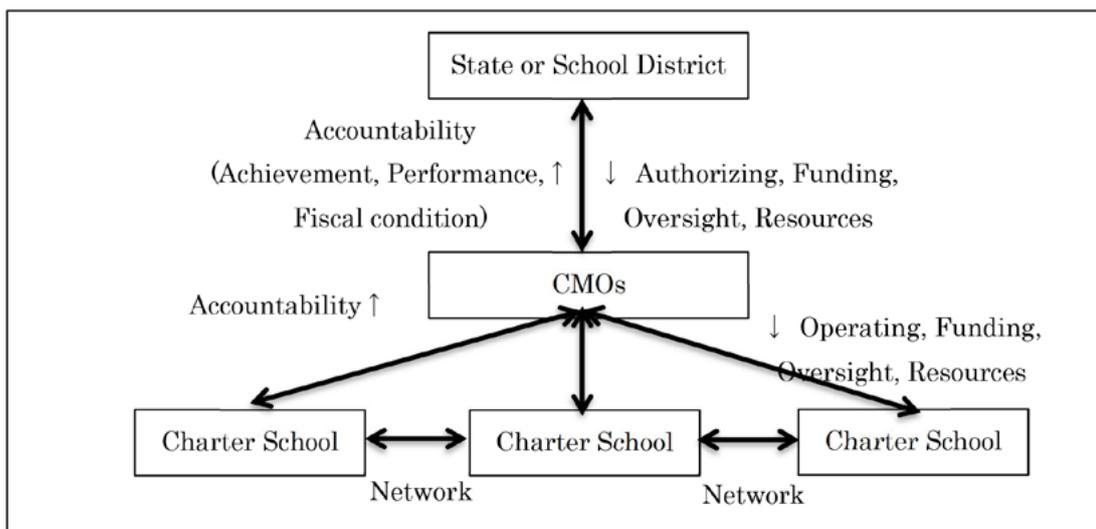


Figure1: The Framework of CMOs and Charter Schools

This framework is regarded as PPP which is one of the main tides of charter schools. As it is said, charter schools’ management is free from many regulations of public bodies, such as state or school districts. Some critics contend that philanthropy plays an outsized role in supporting charters and regard those money as pushing public education ever closer to privatization. And the other criticism is about school gap. For instance, in the long run, privatizations assume that entrepreneurs, drawn by the possibilities of lucrative tuition payments, would offer alternatives to unpopular schools. As the results, weak schools would be eliminated, strong ones would appear in their place, and all schools would feel the pressure of competition to maintain quality. On the other hand, from the beginning of charter school system, it had been said that public schools are strongly criticized because of ineffectiveness of school operations under the district-run/ bureaucratic control. On the other hand, if charter schools need better resources or services, they try to get them not only from public bodies but also private organizations. In policy, adopting the culture of companies or for-profit/non-profit organizations for school operations are emphasized because of effectiveness (competitive pressure for other schools, cost-cut operations, parental satisfactions, various/innovative educational services and so on)

### 3. Career and Technical Student Organizations

As mentioned above, CTSO is one of the organizations that is an extracurricular group for students in career and technical education pathways to further their knowledge and skills by participating in activities, events, and competitions. They provide various career educational services or programs with schools. According to National Coordinating Council for Career and Technical Student organizations (NCC-CTSO), the purpose of CTSO are described as follows.

*Career and Technical Student Organizations (CTSO) enhance student learning through contextual instruction, leadership and personal development, applied learning and real world application. CTSOs work as an integral component of the classroom curriculum and instruction, building upon employability and career skills and concepts through the application and engagement of students in hands-on demonstrations and real life and/or work experiences through a Career and Technical Education (CTE) program. CTSO’s help guide students in developing a career path, a program of study and provide opportunities in gaining the skills and abilities needed to be successful in those careers through CTSO activities, programs and competitive events. In addition, students have opportunities to hold leadership positions at the local, state, and national level and attend leadership development conferences to network with other students as well as business and industry partners (CTSO homepage). In the U.S, there are 8 career and technical student organizations which meet the standards required by NCC-CTSO.*

Table 1: 8 CTSOs

Business Professionals of America	DECA
Family, Career and Community Leaders of America	National FFA Organization
Future Business Leaders of America-Phi Beta Lambda	Skills USA
HOSA-Future Health Professionals	Technology Student Association

(Source: CTSOs homepage)

All of 8 CTSOs are officially supported by national level. Often, on the state level, they are integrated into departments of education or incorporated as non-profit organizations. Some states define CTSOs as “integral parts” of not only middle school but also high school or college education programs. And also, 16 career clusters are made up by CTSOs based on the practice of teaching specific career in specific industries. 1)Health Science, 2)Business, 3)Sales, 4)Finance, 5)IT, 6)STEM, 7) Manufacturing, 8)Logistic, 9)Hospitality, 10)Government, 11)Law, 12)Agriculture, 13)HS, 14)Construction, 15)Training, 16)Arts

#### 4. Data

This research uses the fieldwork data collected in Los Angeles, California in 2011 and data collected by the continuation survey.

Table 2. Data Overview

<p>Charter School 1(Est.2005)</p> <ul style="list-style-type: none"> <li>• Number of students : 668(Hispanic or Latino: 88%, African American: 7%, others:5%)</li> <li>• Number of teachers : 34 • Grade : 6-12 • API Results(Standardized Test): 902 (out of 1,000)</li> <li>• Interviewees: ①principal(53), female, ②10<sup>th</sup> grade teacher(44), female</li> </ul> <p>CMOs A (Est.2001)</p> <p>Mission:</p> <ol style="list-style-type: none"> <li>1. To support for better learning environment (at-risk students).</li> <li>2. To provide high quality educational service and vocational opportunity.</li> <li>3. To expanding regional contribution through our school network.</li> </ol> <ul style="list-style-type: none"> <li>• Interviewees: ③head of school management division(42), male, ④a staff of school management division (34), female, ⑤head of curriculum development division (51), male</li> </ul> <p>CTSO A (EST 1946)</p> <p>Mission:</p> <p>To help students develop college and career readiness skills, Specially, this organizations is focused on preparing students for careers in four clusters; Business Management and Administration, Finance, Hospitality and Tourism, and Marketing.</p>
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Even though charter school 1 is operated in low economic areas, this schools is assessed as distinguished school in terms of student achievement. CMO A set three missions to be achieved by their charter schools, and in each division there is professional staff to develop or improve all school operations. Since these staff work for or give advice to charter schools, charter school teachers have more time to spend with students or in the classroom.

CTSO A in this research is one of the oldest organizations. It provides many ways for students to develop and showcase these critical skills, including “challenges”, competitive events, school-based enterprises, educational conferences, and more. There are more than 225,000 members in 3,700 chapters across 50 states plus chapters in other countries such as China and Germany.

## 5. Vocational and Career Education under the relationship with CMOs and CTSOs

Charter schools and traditional public schools (district-run schools) draw their revenues from the same four main sources. Three are public: federal, state and local governments (like school districts). The fourth is private, comprising philanthropic grants, private contributions, earned income and investor dollars. In combination of these revenues, not only charter schools but also public school would be used as

school’s operating budget. In policy, discussions, this total is routinely divided by a school’s enrollment and restated as per-pupil revenue. That numbers ordinarily rises and falls with several variables, including which state and district the school is in, the grades that it serves, and its students’ special needs. For present purposes, what matters is that per-pupil funding also varies by school type—that is, charter or district-run.

The biggest fiscal challenges faced by charters is that they seldom share in the funds that local districts raise to supplement their state and federal dollars. Those moneys come from municipal or county taxes, which are often property-based and levy-generated. However, under most state legislations, charters schools cannot access such locally generated dollars, even when they’re located within district boundaries and enroll children who would otherwise attend district-operated schools. And in place where charters have some access to local dollars, the per-pupil portion is almost always less than district schools receive. The absence of adequate capital funding means that charter schools must often cover the cost of their facilities from within their already-strapped operating budget or other fund-raising activities in order to obtain private resources or money. For these fiscal limitations among charter schools, CMOs have been taking a really important role for at-risk students within low socioeconomic areas.

In charter school 1, school got many resources in order to improve not only students’ achievement, but also promote parents’ English literacy. Most of all students in this charter school are Hispanic or Latino, which means that their first language is not English, including their parents. These resources or support would not be provided from public entities because these services or salaries are extra. Then we found out many of them are about promoting school environment.

Focusing on the practices of vocational and career education, CMO A use their networks to introduce many role models who graduated from each charter school. Some of them are professionals such as doctors, lawyers, business leaders, and systems engineers. Others are high school or college students. All of them talk to students about their experiences when they were charter school students. Moreover, as an internship practice, students from 7<sup>th</sup> to 9<sup>th</sup> grade visit a hospital, law office, high school, or college several times in one semester to encounter and become familiar with non-elementary-school cultures. These practices are difficult for ordinary public schools (public schools run and controlled by school districts). Since charter schools are public schools, students must study hard to meet state standards (reading, mathematics, social arts, computer, etc.) each year. In addition, charter schools operated by CMO A provide many opportunities with students to think about their own careers or jobs in the future.

In their additional vocational and career educational practices, both CMO A set the task of “climbing the college mountain.” They require students to graduate

from college as their career. In order to accomplish this goal, each school focuses on securing their parents’ help. As most of the parents are immigrants whose first language is not English but Spanish, the schools developed an English course for parents. To promote students’ educational achievement and improve the quality of their daily lives, charter schools must consider how to change their parents’ minds. Charter schools try to help students find and enter their career with the help of their parents or their community.

In terms of CTSO practices, they enhance a school-based enterprise (SBE). A school-based enterprise is an entrepreneurial operation in a school setting that provides goods and services to meet the needs of the market. Students try to invest products to sell and learn economic system and imagine their future career. SBE practices are managed and operated by students as hands-on learning laboratories that integrate National Curriculum Standards in marketing, finance, hospitality or management. According to the website, SBE provides realistic and practical learning experiences that reinforce classroom instruction. SBE can sell to consumers through a permanent location, a mobile kiosk or through internet marketing. Products may include spirit wear, food and beverage items, school supplies, signs and banners and more, while other SBE provide services such as creative design, advertising sales and more.

## 6. Conclusion

Since CMOs are the founder and the operator of charter schools, they have authority to decide whole school operations or practices. So it is free for CMOs to have or expand network with other private organizations. From the view of the policy intention, private organizations or companies are seen as the entities that promote efficiency because they tend to give a quick response to customers for profit. In education, these legerity, flexibility, and cost-cutting strategy are needed.

Then, according to career education, the following are the findings of this study.

With the relations with CMO A, each charter school have developed better vocational and career educational plans (keeping discipline, aim for college, and computer-assisted instructions) and promote professional skills by providing them rich resources. Charter schools and CMO A are important contributors to training and development, particularly in low economic areas.

In order to develop higher educational services, each charter school had a huge network with not only CMO A, but also outside organizations for vocational and career education. Therefore, these schools are able to share their autonomous lessons or educational experiences with other charter schools. In schools with difficulties among students and parents, sharing those educational practices about vocational and career education is necessary for similar schools or communities. However, there

exist hierarchical relations or power structures between charter schools and CMO A that influence decision-making, personnel management, and school operations in their entirety. Even though the charter school system is established against the inefficiency of public school system run by public bodies, operating charter school operation by CMO A is seen as another school governing system (see the figure 2, boxes of dotted line). In that point, the network created by CMOs A includes the possibilities of a new control system of public schools, under providing the resources or supports for their charter schools. But charter schools don't know where those services came from. As an interviewee mentioned, CMO A don't always give a quick response to charter schools.

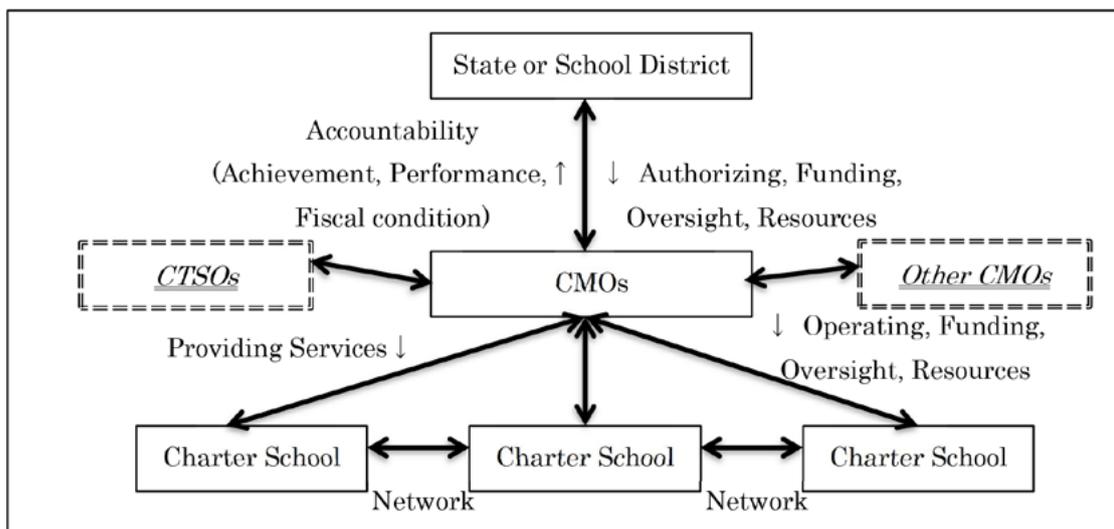


Figure 2: the Framework of PPP including CMOs and CTSO

Amendment by Horai (2020,p.211)

The main reason is that CMO A have various network with other CMOs, private companies or foundations. A new school system of CMO A is remarkable and working well in order to improve charter school education. Teachers focus on their students more because CMO A support them through with many professional knowledge or skills. Also most of the resources they provide are not covered from public bodies. And the network plays an important role for charter schools, too. But that network includes the problematic aspect.

1. The network pressure.
2. “Black box” of partnerships among CMOs.

For future work about the CMOs and charter school operation, system and practices, not only a vertically-structures relationship (public-private partnership), but also a horizontally-structures relationship of private-private partnership.

The advantage or contribution of CTSOs is following

SBE is highly effective educational tools in helping to prepare students for the transition from schools to work or college. For many students, they provide the first work experience; for others, they provide an opportunity to build management, supervision and leadership skills. While some in the education community have only recently discovered the value of school-based enterprise, educators and advisors have used them as a powerful teaching tools. On the other hand, considering to the practice of CTSOs including PPP framework, their framework or relationship is complicated and more bureaucratic system. Those points will be needed the further research.

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# **Peer feedback with less anxiety to improve technological and vocational college students' oral presentation**

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## **Abstract**

Developing workforce with international communication capabilities is a critical issue in the technological and vocational education system. New graduates are expected to give English oral presentation frequently in their professional workplace. Technological and vocational college students who study English as a foreign language (EFL) have encountered many difficulties in oral presentation, e.g. poor language skills, disorganized content and structure, unskillful delivery manners, and lack of interaction with the audiences, due to their speaking anxiety. Rare studies discussed how to improve oral presentation by reducing EFL technological and vocational college students' oral speaking anxiety. This study aimed to investigate how EFL technological and vocational college students reduced their speaking anxiety in oral presentation through peer feedback in oral presentation. 12 undergraduate students in a technological university volunteered to participate in a presentation skills class. They went through peer feedback and peer assessment to reflect on their oral presentation for improvement. Data collected included the scores of peer assessment, an open-ended evaluation sheet for peer feedback, and an open-ended questionnaire. The open-ended evaluation sheet for peer feedback and the open-ended questionnaire were collected and analyzed by content analysis. Results showed that peer feedback had positive effect on enhancing students' oral presentation in terms of their story message, visual message, and physical message. Students' final presentation were improved in the story message by providing more relevant and logical information, including statistics numbers, clear definition, and authentic examples. Specially, some of them engaged the audience by rhetorical questions in the opener, or ended the presentation with a powerful closer. In their visual message of final presentation, students learned from more capable peers' visual aids and made progress in making more effective visual aids. Through providing and receiving peer feedback, they observed and examined peers' multi-media Power Point slides and reflected on their own slides. Some of them pointed out their physical messages were improved by smiling to the audience in the beginning, standing firmly and confidently, and having eye contact with the audiences.

Through reflection, students also generated some learning strategies to deal with their anxiety. The strategies included self-talking to reduce anxiety and spending more time for preparation and rehearsal. Peer feedback facilitated students to learn from each other by negotiating meaning, overcoming difficulties together, reflecting on their own performances, and therefore lead to construct effective learning strategies in oral presentation.

**Keywords:**

Learning strategies; Oral presentation; Peer feedback; Speaking anxiety; Reflection

## 1. Introduction

“21st Century Skills” (“P21 Partnership for 21st Century Skills,” n.d.), which encompass communication, collaboration, critical thinking, and creativity, are keys to college students’ success in academic curriculum and future workplace (Yang, Chuang, Li & Tseng, 2013). Fallows and Steven (2000) pointed out new graduates are expected to excel in professional and employability skills. Particularly, professionals are expected to conduct English oral presentation frequently in their workplace (Campbell et al., 2001). How to prepare technological and vocational college students who study English as a Foreign Language (EFL) to equip with oral presentation skills becomes important (Boud & Falchikov, 2006). However, technological and vocational college students have difficulties to give successful oral presentation due to their poor language skills (Tsai, 2010), disorganized content (Chou, 2011), incoherent logic structure (Barrett & Liu, 2019), unskillful delivery manners (Morell, 2015), and lack of interaction with audiences. In addition, fears and anxiety about English oral communication also are problems for them. Few studies are focused on the improvement of EFL college students’ oral presentation skills. Many studies discuss the construction of evaluation instruments (Carlson & Smith-Howell, 1995; Conor, 2006; Eden, Rink, & Smilde, 2000), or public speaking anxiety (Behke & Sawyer, 2000). That is, most of the researchers pay attention to the issue “what to teach?”, but not the problem “how to teach?” (De Grez, Valcke, & Roozen, 2009). As good oral presentations require clear structures of the content and confidence (Verderber, Sellnow, & Verderber, 2012), further studies should focus on effectively constructing oral presentations scripts and delivering to the public. This study will focus on helping college students successfully deliver oral presentations and alleviate their anxiety through practices.

In order to nurture students succeeding in the global business market, the Ministry of Education in Taiwan greatly emphasizes on promoting both students’ English abilities and professional knowledge (Tsai, 2010). One of the major goals

of EFL instruction in Taiwan is to teach college students how to effectively and appropriately communicating in different business contexts. Thus, English oral presentation skills are regarded as one of the most important issues for enhancing college students' communicative abilities. Communication skills such as delivering a good oral presentation need highly structured content, more professional language and different methods of delivery. For example, a story message with a well-designed introduction, body and conclusion (Tsai, 2010), appropriate body language and voice inflection (Verderber, Sellnow, & Verderber, 2012), and an effective multi-media visual message. Thus, effectively helping college students to prepare oral presentations is an important issue in Taiwan.

### **1.1 The importance of peer feedback**

Collaborative learning enhances second language learning in a social context, where students can actively work together with their peers to construct new language knowledge (Kessler & Bikowski, 2010). With peer feedback, students can find possible solutions to improve their oral presentations. For example, Van Leeuwen, Tiesinga, Jochemsen, and Post (2009) found that peers who had faced the same difficulties could provide helpful suggestions. Cheng, Kuo, Line and Lee-Hsieh (2010) further indicated that active learners should collaborate with peers, and learn from their peer feedback. Yang (2017) also concluded that students learned from peers while using languages in meaningful communication and negotiation with each other. These studies suggest that students can improve oral presentations and construct new language understanding through peer feedback.

### **1.2 Anxiety on EFL oral presentations**

Horwitz, Horwitz and Cope (1986) indicated that EFL learners had more anxiety on oral presentations than other foreign language skills. Young (1990) also found that the student's anxiety of speaking a foreign language mainly comes from speaking in front of the classmates. He pointed out communication apprehension, social anxiety, and self-esteem are the key factors to cause the fear of oral presentations. McCroskey (1978) defined communication apprehension as "an individual's level of fear or anxiety associated with either real or anticipated oral communication with another person and persons" (21, p. 192). Social anxiety is defined as anxiety which surfaces from "the prospect or presence of interpersonal evaluation in real or imagined social settings"(Leary, 19, p. 102), including stage fright, shyness, and embarrassment. Moreover, students with low self-esteem are more likely to have high levels of language anxiety, communication apprehension, and social anxiety (Young, 1990).

Campbell et al. (1991) suggested students might reduce anxiety by doing relaxation exercises, or practicing self-talk. For example, a productive self-talk like, “I can handle this... Just relax... take a deep breath and I’ll start as I rehearsed it” or a positive statement about yourself could be particularly useful. Horwitz (1988) found that teacher’s beliefs could help students decrease anxiety as well. Teachers should “discuss with their students reasonable commitments for successful language learning and the value of some language ability if it is less than fluent” (p. 286). She asserted “as students' beliefs about language learning can be based on limited knowledge and/or experience, the teacher's most effective course may be to confront erroneous beliefs with new information. In some cases, students may never have had their views about language learning challenged”(p. 292). Young (1990) discovered that teachers who were friendly, humorous and patient would make students feel more comfortable in class. Furthermore, Price (1991) pinpointed “students would feel more comfortable if the instructor were more like a friend helping them to learn and less like an authority figure making them perform.” In other words, teachers who encouraged students to make mistakes and gave positive feedback on error correction are helpful in reducing oral presentation anxiety. However, few studies focused on how EFL learners reduce anxiety after receiving peer feedback in their English oral presentations.

The purpose of the study was to investigate the effects of peer feedback and anxiety on college students’ multi-media English oral presentations. Two research questions were addressed.

1. How did EFL college students construct new language knowledge after receiving peer feedback to improve multimedia English oral presentations?
2. How did EFL college students reduce anxiety after receiving peer feedback to improve multi-media English oral presentations?

## **2. Method**

### **2.1 Participants**

A group of 12 undergraduate students were recruited from a 2-credit course entitled “English Presentation Skills for Future Designers” to participate in this study. They were all from non-English major departments. 6 of the participants were freshmen, 2 were sophomores, and 4 were seniors. Most of them had few experiences of English oral presentation, while the 7 freshmen had no experience to give English oral presentations before. They lacked the basic knowledge of presentation skills.

## **2.2 English presentation skills for future designers**

This study was conducted across an 18-week period, 2-credit elective course, for non-English major undergraduate students at a technological university in central Taiwan. *Present Yourself 1* (Gershon, 2015) was the assigned textbook of this course. Students in this course learned to (1) organize their thought processes, (2) understand the accepted structure of oral presentation, (3) cope with the anxiety of oral presentation, (4) communicate effectively in cross-cultural contexts, (5) interact in global business cultures.

The researcher, in the role of the instructor, assisted the 12 EFL undergraduate students to acquire essential knowledge of oral presentation skills and apply it to their own presentations through the four presentation practices in class. The first presentation was about 3-minute long and it was mainly evaluated on the physical message. The second presentation was about 3-minute long and it was evaluated on both the physical message and story message. The third and fourth presentation were approximately 5-minute long and they were evaluated on the physical message, story message, and visual message. For each presentation practice, all students were invited to write peer feedback for their classmates, and the instructor gave comments on students' presentations as well.

## **2.3 Procedures of data collection**

The data included (a) an open-ended evaluation sheet for peer feedback, (b) an open-ended questionnaire, and (c) students' progress from score points. From week 1-3, the instruction was focused on the physical message. Students learned how to improve the physical message by postures, gestures, eye contact, and voice inflection. Then, they gave the first presentation, and this presentation was evaluated based on their physical messages. From week 5-8, the learning activities were emphasized on the story message. Students learned how to organize the ideas and write the script. They wrote the script by following the basic format, including an introduction, body, conclusion and combining each part by transition words. After that, they gave the second presentation, and it was evaluated by their story message. From week 10-12, the instructor discussed and demonstrated cross-cultural issues in the workplace. Then, students were asked to make comparison presentations on different workplace cultures for the third and fourth presentations. The evaluation criteria were the same in these two presentations. After receiving peer feedback for their third presentation, students had 2 weeks to revise their ideas and made some changes. Meanwhile, the tips for creating effective visual messages and explaining visual aids were taught in class in these two weeks. Finally, they gave presentations on the same topic again.

## 2.4 Procures of data analysis

The data analysis focused on how students made improvement for their third and fourth presentations by constant comparative method.

Students' two versions of the presentation were used to answer the first research question: "How did EFL college students construct new language knowledge after receiving peer feedback in multi-media English oral presentations?" The open-ended questionnaire were collected to answer the second research question on how students reduce anxiety after receiving peer feedback. The open-ended questionnaire consisted of questions such as "Did you agree with your classmates comments on your presentation in the physical message? Please give an example"; "How did you deal with anxiety after receiving peer feedback in terms of communication apprehension?"; "How did you deal with anxiety after receiving peer feedback in terms of social anxiety?"; How did you deal with anxiety after receiving peer feedback in terms of self-esteem? "How did your peers' feedback help you improve your oral presentation?"

## 3. Results

The purpose of this study was to investigate how EFL college students constructed new language knowledge of English multi-media oral presentations and coped with anxiety after receiving peer feedback. The results for each research question are reported as follows.

**RQ 1** How did EFL college students construct new language knowledge after receiving peer feedback to improve multi-media English oral presentations?

Table 1 Students' improvement on their English oral presentations

Student	Changes or Differences	Score	Score
1	provide correct statistics numbers to support main points; interaction with the audiences, e.g. ask questions; more eye contact; relevant images and key words on ppt slides	82	90
2	revise main points and use appropriate evidences to explain; more logical connections between main points; more voice inflection & speak more fluently; more eye contact; work better with ppt slides	80	94
3	more eye contact with the audiences and speak more clearly and loudly; more effective explanation of ppt slides	80	86
4	provide more statistics numbers to make comparison; revised conclusion with personal reflections; less grammatical mistakes; more eye contact and voice inflection; more interaction with the audiences ; well-designed ppt slides	78	95
5	delete inappropriate main points and provide new evidences to support the new main points; speak more fluently	70	85
6	define "glass ceiling"; provide clear & more examples for the main points, engage the audiences by raising questions, more eye contact; use gestures	90	96
7	re-organize and change the order of the main points; provide related information to make comparison; speak more slowly and clearly	86	92
8	No change	75	75
9	less grammatical mistakes; use concrete numbers to make comparison; more eye contact; more confidently; use gestures	90	96
10	use gestures; more eye contact; more voice inflection	88	96
11	use relevant examples to support the main points; speak more fluently; improvement on ppt slides, e.g. simple background, appropriate animations & images	78	88
12	No show	0	0

After receiving the peer feedback, most of the students made changes by constructing new language knowledge in their oral presentations. First, in the story message, student 1,2,4,5,7 re-organized most of their story messages by taking out those main points that were not logical or irrelevant to the topic and including more persuasive examples or evidences to support their main points. Student 1,2,4,5,6,7,9,11 provided with more concrete statistics numbers or clear definitions for supporting the main points. Student 1,4,6 engaged the audience by raising rhetorical questions in the introduction or conclusion. Student 4,9 made less grammatical errors of the story message. Second, in the physical message, student 2,3,4,5,7,9,10,11 improved their voice inflection and delivered their presentation more fluently. Student 1,2,3,4,6,9,10 had more eye contact with the audience. Student 6, 9,10 used gestures to act or point out the key words on their visual aids. Lastly, in the visual message, student 1,4,11 improved on their visual aids by choosing the appropriate key words, charts or relevant images to explain the information. Student 2,3 worked better with the visual aids to guide the audience during their presentations.

**RQ 2** How did EFL college students reduce anxiety after receiving peer feedback in multi-media English oral presentations?

All students agreed and appreciated their peers' feedback on their physical messages (Table 2). 4 of the 12 students improved their physical messages by smiling to the audience in the beginning, standing firmly and confidently, and having eye contact with the audiences. 2 of them regarded the feedback as compliments or encouragement. 6 of them told themselves that all the audiences were broccoli.

As for how students dealt with anxiety (Table 4), 3 of the 12 students did self-talk to reduce anxiety. 6 of them spent more time for preparation and rehearsal. They approximately spent 4-6 hours for the fourth presentation. 3 of them mentioned it would take more time to find out the solution.

Table 2 Students' reflections on how to deal with anxiety in terms of communication apprehension

Statements	Frequency (N=12)
Smiled to the audience in the beginning	4
Regarded the audience as broccoli.	6
I did not have this problem.	2

Table 3 Students' reflections on how to deal with anxiety in terms of social anxiety

Statements	Frequency (N=12)
Turned the anxiety to self-confidence	1
Well-prepared and rehearsed	10
I did not have this problem.	1

Table 4 Students' reflections on how to deal with anxiety in terms of self-esteem

Statements	Frequency (N=12)
Did self-talk, e.g. "I am excellent., You'll do a good job., Take it easy."	3
Well-prepared and rehearsed	6
It took more time to have confidence	3

#### 4. Discussion and Conclusion

This study investigated how to improve EFL college students' English oral presentation skills and reduce anxiety through peer feedback. The results correspond to the findings of previous studies (Van Leeuwen, Tiesinga, Jochemsen, and Post, 2009) showing that peers with similar difficulties could provide helpful suggestions. In the story message, students revised their scripts by providing more related and logical information, like statistics numbers, clear definition, and authentic examples. Besides, some of them engaged the audience by rhetorical questions in the opener or reflections in the closer. Furthermore, students benefit a lot from the peer feedback, particularly in the visual message. Through writing the peer feedback, they carefully observed their classmates' multi-media Power Point slides in order to write evaluation sheets. By learning from each other, all of them made progress in making the more effective visual aids. For example, familiarizing and utilizing different functions of the software, choosing the appropriate key words or images, design the layout of the slides. This is similar to previous finding (Kessler & Bikowski, 2010), which showed students could actively collaborate with their peer in construct new language knowledge. In

the physical message, more than 50% of the students improve the eye contact after receiving peer feedback. 6 of the them focused on their voice inflection and gestures while giving the presentation. This finding corresponds to previous studies Young (1990) suggested that a more relaxed and friendly classroom environment would decrease students' anxiety of oral presentations. Campbell et al. (1991) pointed out students might reduce anxiety by doing relaxation exercises, or practicing self-talk. The results of this study showed that 3 students did self-talk to reduce the anxiety.

However, the findings also indicated that not only the teacher's encouragement, but also peers' positive feedback could also help students to alleviate their anxiety. Because of peers' encouragement, students felt supportive and would like to spend time for rehearsal. Therefore, preparation is another key factor to reduce students' anxiety. Further studies can investigate why and how preparation and rehearsal will reduce oral presentation's anxiety. The connection between teacher's comment and peer feedback can be explored.

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# **A Study on the Evolutionary Characteristics and Development Trends of Industry-Education Integration Policies in China**

## **——Based on the Policy Texts of 2013-2021**

### **Abstract**

Industry-education integration is an important measure to promote national economic system reform and implement the major decisions and deployments of the Party Central Committee and the State Council on education and talent reform and development. Since its appearance in the policy texts of 2013 issued by the central government, industry-education integration has gone through two stages, i.e. exploration and maturation. The study analyzes the policy texts of the past nine years from 2013 to 2021 to reveal the evolutionary characteristics of industry-education integration from two dimensions, i.e. quantity and content. In terms of quantity, the number of policies enacted has shown a moderate to rapid increase, with the enactors changing from single departments to multi-departmental alliance, and the covered areas changing from single to all-round and multi-level; In terms of content, the policies have shown characteristics such as increasingly richer understanding of the meaning and essence of industry-education integration, deeper understanding of the subjectivity of enterprises, continuous materialization of implementation strategies and paths, and more specific and refined supporting policies. From this, the study draws the conclusion that the development trend of industry-education integration policies in China features the continuous innovation of work and coordination mechanisms among central government departments. Besides, local government-led regional policy-making has become the focus of industry-education integration, expanding to multiple levels and fields. The rights and responsibilities of all stakeholders are clarified through the legal system, with importance attached to the exploration of policy implementation paths that are standardized, scientific, and systematic.

**[Key Words]** Industry-education integration; policies; evolutionary characteristics; development trends

Since “industry-education integration” was first coined in the Opinions on Deepening the Comprehensive Reform in the Education Sector issued by the Ministry of Education in 2013, the term has evolved from a purely vocational education policy to a comprehensive and multi-level national talent training strategy covering both vocational education and higher education. Currently, industry-education integration is an important measure to promote national economic system reform and implement the major decisions and deployments of the Party Central Committee and the State Council on education and talent reform and development.<sup>[1]</sup> The purpose is to comprehensively promote the organic connection between the chains of education, talents, industries, and innovation, and address the supply-side structural reform of talents in the implementation of the national innovation-driven development strategy. As of 2021, a total of 104 policies relevant to industry-education integration have been issued by the central government. By reviewing and analyzing these policy texts, the study finds the evolutionary characteristics of industry-education integration policies in China, which will shed light on the current essence and grasp the development trends of industry-education policies so that they can be better implemented in practice. The study selects policy texts according to the following principles: (1) Policies issued by central governmental departments; (2) In the forms of regulations, opinions, measures, notices, etc.; (3) Involving explanations on industry-education integration. Representative policies are shown in Table 1.

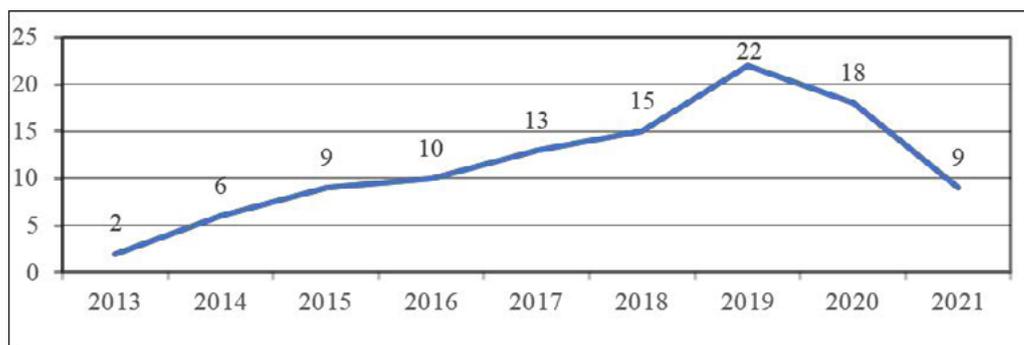
**Table 1 Major industry-education integration policies**

Year of Issuance	Policy Title	Abbreviation	Issuing Department
2013	Opinions on Deepening the Comprehensive Reform in the Education Sector 2013	Opinions 2013	Ministry of Education
2014	Decision on Accelerating the Development of Modern Vocational Education	Decision 2014	State Council
2015	Several Opinions on Deepening the Reform of Vocational Education and Comprehensively Improving the Quality of Talent Training	Opinions 2015	Party Central Committee
2017	Several Opinions on Deepening Industry-Education Integration	Opinions 2017	State Council
2017	Implementation Measures for Coordinating and Promoting the Construction of World First-Class Universities and Disciplines (Interim)	-	3 departments including the Ministry of Education
2018	Measures for the Promotion of University-Enterprise Education for Vocational Schools	-	6 departments including the Ministry of Education
2019	Implementation Plan for National Vocational Education Reform	Vocational Education Items 20	State Council
2019	Implementation Measures for the Construction of Industry-Education-Integrated Enterprises	-	State Council
2019	National Pilot Implementation Plan for Industry-Education Integration Construction	-	6 departments including the Ministry of Education, Ministry of Education, Ministry of Industry and Information Technology
2020	Guidelines for the Construction of Modern Industrial Schools (Trial)	-	Ministry of Industry and Information Technology
2020	Implementation Plan for Vocational Education Quality Improvement (2020-2023)	Quality Improvement Implementation Plan	9 departments including the Ministry of Education
2021	Opinions on Promoting the High-Quality Development of Modern Vocational Education	High Quality	Party Central Committee, State Council

## I. On the evolutionary quantitative characteristics of the policy texts on industry-education integration in China

### (1) Moderate to rapid increase of the number of policies enacted

According to analysis, industry-education integration policies have evolved from featuring moderate increase to rapid increase, divided by the publication of the Several Opinions on Deepening Industry-Education Integration (hereinafter referred to as Opinions 2017) by the General Office of the State Council in 2017. The policies have experienced two stages i.e. exploration and maturation. In the exploration stage (2013-2016), a total of 27 policies were enacted, mainly targeted at promoting corporate-based schooling and exploring systems and paths to involve enterprises in vocational education. In the maturation stage (2017-2021), 77 policies were enacted, starting from Opinions 2017, highlighting top-level policy design at the national level and increasingly more systematic, comprehensive and feasible policy-making. The numbers of industry-education integration policies enacted from 2013 to 2021 in China are shown in Figure 1.



**Figure 1 Line chart of the number of industry-education integration policies enacted from 2013-2021 in China**

### (2) Policy enactors changing from single departments to multi-departmental alliance

In 2013-2016, industry-education integration policies were mostly enacted by a single central government department, such as the State Council, the General Office of the State Council, or the Ministry of Education. Since 2017, the enactors have shown a clear tendency to be multi-departmental alliances. According to statistics, a total of 14 government departments were involved in policy enactment, including the Ministry of Education, National Development and Reform Commission, Ministry of Human Resources and Social Security, Ministry of Industry and Information Technology, Ministry of Finance, General Office of the Ministry of Housing and Urban-Rural Development, General Office of the Ministry of Agriculture and Rural Affairs, General Office of the Ministry of Veterans Affairs, General Office of the State-owned Assets

Supervision and Administration Commission of the State Council, Comprehensive Department of the Poverty Alleviation Office of State Council, General Office of the All-China Federation of Trade Unions, General Office of the Central Committee of the Communist Youth League, General Office of the All-China Women's Federation, and General Office of China Disabled Persons' Federation. The Measures for the Promotion of University-Enterprise Cooperation for Vocational Schools (2018) were jointly issued by six departments, while the Implementation Plan for Vocational Education Quality Improvement (2020-2023) issued in 2020 involved as many as nine departments. Among the 77 policies enacted since 2017, 58 were jointly issued by multiple departments, accounting for 75.3%.

### **(3) Covered areas changing from single to all-round and multi-level**

Industry-education integration policies in China started in the field of vocational education, and then developed into a comprehensive and multi-level implementation strategy covering all levels of education and industries. This, above all, is reflected in its all-round and multi-level coverage in the education sector. In 2013, Opinions on Deepening the Comprehensive Reform in the Education Sector proposed to “improve the industry-education integration system in vocational education”, proving how industry-education integration was first proposed as a vocational education system. In 2015 (see Table 2), two policies were enacted, one involving first-class disciplines in first-class universities and the other involving minority education, reflecting how the function and positioning of the policy has begun to be extended to multiple levels and fields. In Opinions 2017, industry-education integration was clarified as an effort to deepen the reform of vocational education and higher education. It was even proposed that “craftsmanship be incorporated into basic education.” Policies enacted since then were expanded to cover more fields, including labor education, distance education, artificial intelligence talent training, outstanding agriculture and forestry talent training, outstanding engineer training (see Table 2), testifying to the ever prominent all-round and multi-level features of industry-education integration.

Secondly, it is reflected in its all-round and multi-level coverage across industries. In advancing industry-education integration, the National Development and Reform Commission and the Ministry of Education issued the Implementation Measures for the Construction of Industry-Education-Integrated Enterprises (Trial) in April 2019. In September of the same year, six ministries and commissions jointly issued the National Pilot Implementation Plan for Industry-Education Integration Construction. In October, the Pilot Work Plan for Construction and Cultivation of National Industry-Education-Integrated Enterprises was released, proposing to pilot the layout of developing industry-education-integrated cities, industries, and enterprises, providing comprehensive, multi-level, and systematic planning in terms of pilot goals, objects, tasks, supporting policies, organization and implementation.

**Table 2 Statistics on industry-education integration policies in other levels of education in China**

Year	Policy Title
<b>2015</b>	1. Overall Plan for Coordinating and Promoting the Construction of World First-Class Universities and Disciplines issued by the State Council
	2. Decision on Accelerating the Development of Ethnic Education by the State Council
<b>2018</b>	1. Action Plan for Artificial Intelligence Innovation for Colleges and Universities
	2. Opinions on Plan 2.0 for Strengthening the Combination of Agriculture, Science and Education and Cultivating Outstanding Agriculture and Forestry Talents
	3. Opinions on Plan 2.0 for Speeding up the Construction and Development of New Engineering and Cultivating Outstanding Engineers
<b>2020</b>	1. On Printing and Distributing the Guidance Outline for Labor Education in Universities, Middle Schools and Primary Schools by the Ministry of Education
	2. On Printing and Distributing the National Open University Comprehensive Reform Plan by the Ministry of Education
	3. Action Plan for Energy Storage Technology Discipline Development (2020-2024)
	4. Several Opinions on Double First-Class Construction of Colleges and Universities to Promote Disciplinary Integration and Accelerate the Cultivation of Graduate Students in the Field of Artificial Intelligence
	5. Notice on the Guidelines for the Construction of Characteristic Demonstrative Software Schools (Trial)
	6. Notice on Announcing New Agricultural Science Research and Reform Practice Projects by the General Office of the Ministry of Education

## II. On the evolutionary characteristics of industry-education integration policy text content in China

### (1) Increasingly richer understanding of the meaning and essence of industry-education integration policies

By reviewing the content of industry-education integration policies, the study finds that policy enactors have been gradually deepening their understanding of the essence of industry-education integration. The term was first proposed as a vocational

education system, designed to reform the schooling system of vocational education. (Opinions 2013). Afterwards, it was raised as a principle for the development of modern vocational education in the Decision on Accelerating the Development of Modern Vocational Education of the State Council (2014) and interpreted as the “simultaneous planning of vocational education and socioeconomic development, coordinated promotion of human resource development and technological progress, and promotion of education and teaching reform and industrial transformation and upgrading”. Also proposed were measures to stimulate the vitality of vocational education, such as “give full play to the subjectivity of enterprises in school-running”, “explore the development of joint-stock and mixed-ownership vocational schools”, “strengthen the construction of industry-leading capabilities” and “encourage multiple subjects to form vocational education groups”. Arguably, the understanding of industry-education integration at this stage was targeted at addressing university-enterprise cooperation in vocational education and proposing a higher principle to harmonize work of all aspects. However, there was no clear and direct expression on how to implement industry-education integration and how it was linked to the work of various aspects. Therefore, at this stage, industry-education integration was manifested as the establishment of industrial colleges and vocational education groups in practice. The effect of such measures, however, seemed to fall short of the purpose of realizing the subjectivity of enterprises in vocational education. It was not until Opinions 2017 was issued that industry-education integration was first adopted as a single policy enacted by the highest level of the central government, which testified to its unique significance not like any other education policy proposed as principles. Opinions 2017 comprehensively explained the significance of deepening industry-education integration in the new era, emphasizing that “industry-education integration is an important measure to promote coordinated socioeconomic development”, “an effort to promote the organic connection among the chains of education, talents, industries, and innovation”, a comprehensive and profound reform in vocational education, higher education, and even basic education. The goal is to “promote the full integration of the structural elements of the talent training supply side and industry demand side” by “highlighting the subjectivity of enterprises”, in order to “address the major structural imbalances between the talent training supply and industry demand” and “enhance the core competitiveness of industries and gather new development momentum”. These policy texts reflect a more comprehensive and deeper understanding of the essence of industry-education integration by the central government, and clearer design on how to implement industry-education integration and what implementation principles and measures are to be pursued systematically.

## **(2) Deeper understanding of the subjectivity of enterprises**

cooperation. However, the subjectivity of enterprises in vocational education, especially the relationship between universities and enterprises, has remained unclear for a long time. Policy-wise, the expressions on the relationship between vocational education and industries have gone through three stages, i.e, “combination of education and productive labor” (1949-1977), “combination of industries and education” (1978-2012), and “integration of industries and education” (2013-present)<sup>[2]</sup>. Comparing the policies before and after, especially since the issuance of Opinions 2017, the policy orientation and positioning of industry-education integration have fundamentally changed. As a higher principle of university-enterprise cooperation and even the development relationship between education and industry, the term was proposed based on a new understanding of the relationship between the two. The essence lies in the transformation from the former model where universities seek one-way cooperation from enterprises, to the two-way and win-win exchange between the two. It is therefore crucial whether the subjectivity of enterprises can be given full play, which determines the quality improvement of university-enterprise cooperation and vocational education. As for the subjectivity of enterprises, its value became increasingly clearer as relevant expressions evolved from “give play to the subjectivity of enterprises” (Decision 2014, Opinions 2015) to “enhance the important subjectivity of enterprises” (Opinions 2017), and to “dual-subjectivity in talent training by universities and enterprises” in Vocational Education Items 20 in 2019. For this reason, since 2019, specific policies have been introduced one after another by the National Development and Reform Commission and other departments for cultivating and building industry-education-integrated enterprises and industries to further clarify the value of such policy, and “give full play to the leading role of large enterprises in deepening the reform of industry-education integration”.

### **(3) Continuous materialization of implementation strategies and paths**

If industry-education integration policies entered the maturation stage since the release of Opinions 2017, its continuously materialized implementation methods and paths are an important milestone. By reviewing the policy texts on industry-education integration since 2017, the study finds that the policy has been continuously deepened, refined, and materialized through practice and reflection.

In terms of the coordination between industry-education integration and development, Opinions 2017 proposed to “simultaneously plan industry-education integration and socioeconomic development” and “coordinate the layout of vocational education and regional development”. While it has put forward overall requirements and measures, specific paths to realization were still lacking. In Quality Improvement Implementation Plan, these two requirements translated more specifically into “deepening the supply-side structural reforms of vocational education”, clarifying the need to “establish an industry talent data platform, publish an industry talent demand

report, promote the precise coordination between vocational education and the demand for industry talents, and develop an industry-education integration connecting diagram for vocational education to guide the layout optimization of vocational schools and disciplines.” In the Opinions on Promoting the High-quality Development of Modern Vocational Education, the policy was further elaborated as “Governments at all levels shall classify, prepare, and release reports on the dynamic adjustment of industrial structure, employment status, and predicted demand of industry talents”.

In terms of the school-running system, Opinions 2017 put forward six measures to strengthen the important subjectivity of enterprises and specific actions on “widening the channels for enterprise participation”, “deepening the reform of ‘introducing enterprises into education’”, and “carrying out productive internships”. For the first time, the department responsible for each measure was specified in the policy annex. However, “reforming the school-running system” was not implemented as a commanding strategy in actual practice despite the seemingly clear division of responsibilities. Also not clarified was the coordination and management responsibilities of the government in policy enactment. This inevitably led to fragmented administration and transfer of responsibilities to lower-level units. The 2018 Measures for the Promotion of University-Enterprise Cooperation for Vocational Schools further clarified regulations on the form of university-enterprise cooperation, promotion measures, and supervision and inspection. However, the requirements were still put forward in parallel, without stating which measures were critical and commanding. After two years of policy enactment, practical experience has shown more and more clearly that the school-running system reform is key to giving full play to the subjectivity of enterprises in running schools. Therefore, government promotion, management and coordination is indispensable. This explains why policies enacted since then focus increasingly more on addressing said issue. In 2019, Vocational Education Items 20 proposed to “build a diversified school-running pattern”, and that “government departments at all levels must deepen the reform of streamlining administration, delegating power, improving regulation, and upgrading services and accelerate the transformation of functions... The government shall be mainly responsible for strategic planning, policy formulation, and legal regulation.” The following releases of the “National Pilot Implementation Plan for Industry-Education Integration” and the “Guidelines for the Construction of Modern Industrial Schools (Trial)” have both indicated the determination and aspiration of the government to lead the implementation of industry-education integration. In the Opinions on Promoting the High-Quality Development of Modern Vocational Education in 2021, policies of promoting the integration of industry and education were expressed as “improving the industry-education integration system” and “innovating university-enterprise cooperation mechanisms”. By then, the reform of school-running mechanisms and system has clearly become a commanding strategy for promoting industry-education integration and stimulating the subjectivity of enterprises. It was only under this

strategy that all previous measures may be gradually implemented. Moreover, each specific policy statement has emphasized the important responsibility of the government, such as “promote the joint construction of leading areas of vocational education innovation development between ministries and provinces and continue to deepen the east-west cooperation in vocational education” in “Optimizing the Supply Structure of Vocational Education”, and “build a diversified school-running pattern with government coordination, proactive organization of industries and enterprises, and in-depth participation of social forces” in “Improving the Diversified School-Running Pattern”. Furthermore, in “Coordinated Promotion for Deeper Industry-Education Integration”, it was also emphasized that “governments at all levels shall coordinate the scale, structure and level of vocational education and human resource development to incorporate industry-education integration into socioeconomic planning”.

#### **(4) Continuous refinement and deepening of supporting policies**

Reviewing industry-education integration policies since the issuance of Opinions 2017, the supporting system mentioned has shown obvious continuous refinement and deepening. As is shown in Table Opinions 2017, most of the systems proposed to be built are macroscopic and comprehensive which require systematic design and construction, while Vocational Education Items 20 delved deep into the field of practice, specifying many feasible and effective systems desperately needed in the short term. As for High Quality, it further explored the supporting systems that guarantee the implementation effects of various systems.

Policy	Systems (mechanisms) clearly proposed to be built
Opinions 17	<p>Improve the promotion mechanism for the construction of first-class universities and disciplines;</p> <p>Improve the demand-oriented talent training structure adjustment mechanism;</p> <p>Improve the internship system in enterprises for students;</p> <p>Explore ways to purchase services and implement tax policies;</p> <p>Improve financial and technological planning and management;</p> <p>Improve the post-research evaluation system of universities;</p> <p>Continue to strengthen the construction of enterprise technology centers and university technology innovation platforms;</p> <p>Implement the enterprise staff training system;</p> <p>Incorporate hands-on practice into relevant courses of primary and secondary schools and comprehensive quality evaluation of students;</p> <p>Adhere to the school-running system of vocational education featuring university-enterprise cooperation and work-integrated learning;</p> <p>Deepen the reform of the full-time school-running system;</p> <p>Explore teaching qualification standards and technical title evaluation methods tailor-made for vocational education and applied schools;</p> <p>Establish and improve the council system of vocational schools and universities;</p>

	<p>Explore the mutual recognition and conversion of course credits between universities and enterprises;</p>
<p>Vocational Education Items 20</p>	<p>Improve the regular evaluation mechanism of major settings;</p> <p>Improve the specialized teaching resource pool and establish resource certification standards and transaction mechanisms for joint construction and sharing platforms;</p> <p>Select and identify batches of online quality vocational courses;</p> <p>Apply modern information technology to improve teaching methods and promote the development and general application of online learning spaces such as virtual factories;</p> <p>Establish a certification system for industry-education-integrated enterprises, provide them with a "financial + fiscal + land + credit" incentive portfolio, and implement relevant tax policies in accordance with regulations;</p> <p>Build high-level specialized training bases for industry-education integration with radiation and leading effect;</p> <p>Lead a group of high-level engineering schools to hold vocational and technical teacher education;</p> <p>Implement teacher quality improvement plans in vocational colleges;</p> <p>Explore the establishment of a high-level, structuralized, and innovative teaching team;</p> <p>Regularly organize and send backbone teachers of vocational colleges to study abroad;</p> <p>Pilot the open recruitment of high-level and advanced talents through direct inspection in vocational schools;</p> <p>Establish and improve the methods for vocational colleges to independently hire part-time teachers, etc.;</p> <p>Use certain proportions of income of vocational schools gained through university-enterprise cooperation, technical services, social training,</p>

	<p>self-run enterprises as a source of performance wages;</p> <p>Improve systems for corporate management and technical personnel, school leaders, and backbone teachers to assume multiple roles and earn multiple wages;</p> <p>Establish open, transparent and standardized private vocational education accesses and approval systems, explore the negative list system of private vocational education, and establish and improve the exit mechanism;</p>
<p>High Quality</p>	<p>Initiate the implementation of local pilot projects for the construction of a skill-based social vocational education system;</p> <p>Implement a lifelong vocational skill training system and an on-the-job continuing education system;</p> <p>Improve systems of state-owned assets evaluation, property rights transfer, distribution of rights and interests, leader and personnel management, etc.;</p> <p>For industry and information technology departments, take the participation in university-enterprise cooperation as an important criterion for the selection of demonstrative enterprises;</p> <p>For departments of education, human resources and social security, take the effectiveness of university-enterprise cooperation as an important criterion for evaluating the quality of vocational schools;</p> <p>For state-owned assets supervision and management institutions, support enterprises to participate in and organize vocational education;</p> <p>Actively explore methods for vocational school interns to be insured against work injury;</p> <p>Accelerate the development of internship liability insurance and personal accident insurance for vocational students;</p>

### **III. Development trends of industry-education integration policies in China**

The evolution of industry-education integration policies in China is a gradual process based on practice and reflection, a testament to the central government's dedication to promoting industry-education integration, as well as the value of continuous exploration and innovation. In recent years, the central government has introduced industry-education integration policies with an intensity never seen before, and repeatedly adjusted expressions and refined policies to delve into the construction of systems to clarify the subjectivity of industry-education integration. All this has shown that industry-education integration has become a core strategy of the talent supply-side reform in China, a government-led fundamental reform with the participation of multiple subjects. Judging from the current policy development trends, efforts should be continued and deepened in the following aspects, for this is the only way to truly implement industry-education integration policies in a sustainable manner.

#### **(1) Continuous innovation in the work and coordination mechanism among central government departments**

Since industry-education integration policies involve the management and coordination of multiple fields and multi-levels of subjects, joint policy enactment by multiple departments has become a normality. This means that the implementation of said policies will also inevitably involve communication and cooperation between multiple departments. Particularly, when it comes to the interests of relevant subjects, standard operating procedures are required for organization and coordination. Therefore, it is necessary to establish a normalized work mechanism based on the formulation and implementation of industry-education integration policies, and continuously innovate the problem-based dynamic coordination work mechanism to eventually form a stable work system.

#### **(2) Prioritize local government-led regional policy formulation in industry-education integration policy development**

According to the development characteristics of industry-education integration policies, the overall coordination of the government has become the core issue of future policy-making and implementation. A large number of practices have shown that only the government can fully mobilize diverse local subjects by playing its leading role in policy-making and formulating a scientific, reasonable and feasible implementation strategy that meets the local economic development level, industry development needs, the current situation of local education. Meanwhile, only

when the government gives full play to its overall coordinating function in policy implementation can it ensure that the conflicts of interest between the subjects are resolved in a timely manner, attract the participation of multiple subjects, and form joint forces to continuously promote industry-education integration.

### **(3) Enrichment and extension of industry-education integration policy-making to multiple levels and fields**

Although Opinions 2017 has clearly positioned industry-education integration policies as a national development strategy covering education of multiple fields at multiple levels, the policy is still mainly implemented in the field of vocational education. With the continuous improvement of the national talent evaluation system, the realization of industry-education integration still requires the participation and efforts of educators in more fields and levels considering the entire talent training chain, for example, on studying how basic education can expand students' professional awareness and planning and what effective vocational guidance is to be offered, or how colleges and universities can be deeply integrated with industries while also opening up talent training channels to form integrated talent cultivation and development strategies in combination with industry-education integration policies in vocational education.

### **(4) Clarification of the rights and responsibilities of various stakeholders through the legal system**

So far, industry-education integration policies have developed to have a clear stake in the coordination of multi-stakeholder relationships, especially relevant to raising the awareness and calling for actions of business entities, and the boundary of interests between universities and enterprises and the paths towards cooperation. The core issue is whether industry and education can be integrated and the quality of such integration. Despite the large number of specific policies and systems already introduced based on the interests of different subjects in response to practical problems, it is the legal system that can finally determine the division of rights, responsibilities, and interests of industry-education integration subjects. Another important incentive system is the clarification of legal provisions to restrict subjective behaviors.

### **(5) Emphasis on exploring standardized, scientific, and systematic implementation paths**

At present, industry-education policies have entered a stage of in-depth development. Insights into effective methods of policy implementation are much needs

for future policy development. Currently, the reform of school-running system remains the commanding issue, the resolution of which may be followed by more complicated problems. It is necessary to further explore standardized, scientific and systematic policy implementation paths in order to promote the in-depth implementation of industry-education integration policies in an orderly manner.

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# **Thinking on teacher's digital literacy in vocational school in the post COVID-19 Era ——taking Chinese situation as an example**

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## **Abstract**

The COVID-19 pandemic has changed the normal teaching model radically and online teaching and learning has turned into the primary model. In the post-pandemic era, exoteric and diversified teaching is the integration of multiple teaching models with various objects, contents, and demands, rather than an unsophisticated combination of traditional courses and online education. The practical characteristics vocational education makes it more complex to implement online learning than in other type of education like in the academic education. In addition to the teaching of professional theoretical knowledge, teachers were more bewildered by how to carry out online teaching in practice teaching which focuses on practical skills and practical working ability. And through the survey, the fact is that the level of teachers' ICT ability is different during the online teaching. In order to ensure the effectiveness of online-based teaching, to improve teachers' and students' digital literacy in a short time has become a very important challenge in pandemic as well as "post-pandemic era". This paper would analyze the needs of vocational college teachers' digital literacy in "post-pandemic era", as well as summarize the current situation of teachers' digital literacy in Chinese vocational colleges on the basis of existing surveys and give reflection from technical support, teachers' and students' digital literacy and practical community on the ways to improve teachers' digital literacy and online education in vocational education in the post pandemic era.

**Keyword:** Digital literacy, Vocational Education, Teacher's professional development, post COVID-19 Era

## **1. Introduction**

Since January 2020, the Covid-19 pandemic has swept the world. Regular school teaching was forced to stop. In response to the impact of the pandemic on higher education, China's Ministry of Education issued a guideline on online teaching in early February, to urge universities across the country to „suspend classes but not teaching

or studying". Under this initiative, universities across the country have organized the largest online teaching program in a very short time, with the largest number of courses and students. The teaching model has changed radically, online teaching and learning has turned into the primary model. In the post COVID-19 era, exoteric and diversified teaching is the integration of multiple teaching models with various objects, contents, and demands, rather than an unsophisticated combination of traditional courses and online education.

Online teaching during the pandemic contains opportunities for educational innovation and teaching reform, such as students' self-growth, teachers' professional development and universities teaching reform, but it also brings great challenges to students, teachers and universities. Actually, in addition to the teaching of professional theoretical knowledge, teachers were more bewildered by how to carry out online teaching in practice teaching which focuses on practical skills and practical working ability, such as work-based learning, apprenticeship, practical learning, etc. during the epidemic period. Although the epidemic has prompted most of the vocational college teachers to carry out online teaching activities, the level of teachers' ICT ability is different. In a number of Chinese surveys, most teachers seemed to teach through the network platform as well as use lots of digital teaching resources, but they still follow the traditional teaching methods and evaluation standards. In order to ensure the effectiveness of online-based teaching, how to ensure that many teachers change their teaching roles to adapt to comprehensive online teaching has become a key element. How to improve teachers' and students' digital literacy in a short time has become a very important challenge in epidemic as well as "post-epidemic era".

## **2.Requirements of information literacy of teacher in vocational education in the post COVID-19 era**

In 2020, China has successfully held "Two Sessions"<sup>3</sup> during the severe epidemic. The construction of teachers in vocational education was subjected to the People's further attention, which the ranking<sup>4</sup> raised from sixth last year to second this year. Meanwhile online education has become to the hot spots of education in two sessions for the first time. In China, a large number of information-based teaching infrastructures have been launched in large quantities, while many information-based platforms have responded positively and given support to education, also a large number of free

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online resources are available to the whole network. During the epidemic period, more than 2000 experimental projects in China's national virtual simulation experiment teaching project sharing platform were opened free, which covering 255 majors and 1561 courses in 41 professional categories.

Online education has developed in China for more than ten years, especially the COVID-19 situation has promoted the further development of online teaching. As a new teaching form, online education contains rich value of knowledge dissemination, educational innovation and emergency compensation. At present, epidemic in China is basically under control. At this stage, it has entered the post epidemic era. The so-called post epidemic era is especially the era after the New Coronavirus epidemic. In the post epidemic period, education presents the form of "double line teaching" that integrates online teaching and offline classroom. The large-scale online teaching during the pandemic is an information-based teaching practice, which improves the ability of teachers to use the online teaching platform, widens the channels for teachers to obtain high-quality teaching resources, and so that makes the classroom present a new form of integration of online teaching and offline classroom teaching.

In vocational education, the practical teaching, the teaching conditions of vocational colleges as well as the information literacy of teachers and students relatively limit the implementation of online teaching.

### **Firstly, the characteristics and requirements of practical teaching in vocational education limit the implementation of online teaching**

As a type of education, vocational education emphasizes "Teaching by doing, learning by doing", vocational education does not always follow the logic from theory to practice. Vocational education aims to cultivate front-line skilled talents for the society. The main task of teaching is to cultivate students' operational ability and skills through the combination teaching of theory and practice. Practical teaching is an important part of the whole teaching process, which is mainly realized by organizing students in a planned way through observation, experiment, training, practice and other teaching links under certain professional activity scenarios such as laboratory and practice place. However, online practical teaching activities can only be in a

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<sup>3</sup> The two sessions are collectively referred to as the National People's Congress of the people's Republic of China and the Chinese people's Political Consultative Conference held over the years since 1959.

<sup>4</sup> The ranking here mean that during the "Two Sessions" many national hot issues would be discussed, such as economic, social development and education and so on. There are many hot spots in the field of education, and vocational education was second issue which was concerned by "Two sessions" this year.

virtual environment, which cannot complete the face-to-face communication between teachers and students, which means that it is not possible for students to experience it personally and intuitively. Although some qualified colleges and universities use virtual simulation laboratories in their online teaching process, this kind of laboratory cannot be completed by all majors and any practical operation. Therefore, it is more complex to implement online learning in the field of vocational education than in other type of education especially in the academic education.

### **Secondly, information literacy of Vocational School Teachers is one of the necessary factors for implementing online teaching**

Online teaching has brought great challenges to teachers. According to the survey of 13997 teachers in China by the teacher development center of Xiamen University, there are many challenges in teachers' online teaching, such as psychological pressure, workload, learning and teaching technology, changing teaching concepts and teaching/learning habits. In the process of integrating online teaching into offline classroom teaching, teachers should not only qualified in internet education, but also face the challenge of reconstructing their teaching ability. Such as the ability to integrate information technology into teaching, which include the innovation of teaching concept, the improvement of teaching design and implementation ability, the enhancement of teaching evaluation ability and so on. Teachers should not only to obtain the professional and psychological quality that necessary in offline teaching, but also should to own certain media literacy (like to identify, select and evaluate to guide the development of online teaching).

China has been promoting the in-depth integration of teachers' information literacy and education, as well as encouraging teachers to use information technology to improve teaching quality, innovate teaching mode, make good use of high-quality digital resources by using flipped classroom and hybrid teaching. Teachers are required to actively adapt to new technological changes such as informatization and artificial intelligence to actively and effectively carry out their teaching. During the pandemic, some colleges and universities have conducted short-term training to enable teachers to quickly master online teaching skills, but from the feedback results of the survey, some teachers were not really fully prepared for online teaching. A survey of 1147 teachers from 28 undergraduate and higher vocational colleges across the country shows that the vast majority of the sampled teachers (85.7%) have initially possessed the basic ability of information-based teaching, but the proportion of teachers with high application level is relative low (14.3%). (Han & Ge, 2018) Although more than 75% of teachers are familiar with online learning platform software, realizing online

teaching independently. However, there are still many inadaptable phenomena in online teaching during the epidemic, which result in poor effect of online teaching. The reason is that teachers did not understand the “Internet + education” thoroughly, and have not changed their traditional teaching concepts to keep pace with the era of “Internet plus education”. Another regrettable phenomenon is that information technology does not improve efficiency and effectiveness of teachers' teaching, which causes a lot of workload. Nearly 40% of teachers spend more than 6 hours on online teaching work every day, and 13.6% among them spend more than 9 hours. According to the survey on the impact of technical tools on the smooth implementation of teachers' online teaching during the epidemic, 63.64% of teachers think that the impact is so serious that they have to spend a lot of time to deal with the impact of technical tools. Teachers have owned certain information technology skills, but they still have to face many problems. These problems come from platform's software and hardware and classroom interaction, such as platform software congestion and instability, network jam, loud noise and incomplete PowerPoint display, which make teacher cost lots time to prepare for teaching every day. (Hou, Liu & Lu, 2020) On the whole, the large-scale development of online teaching has not triggered a comprehensive teaching reform. The integration of online teaching and offline classroom teaching still remains in the reference of high-quality online teaching resources, and deep-seated teaching reform has not occurred. (Chen, 2020)

### **Thirdly, online teaching requires students to have corresponding learning ability**

As the object of teaching, teaching also puts forward new requirements for students. Due to urgency of the epidemic, some colleges have no time to train students about online learning, thus it is difficult for students to accept this teaching mode in a short time, and the teaching effect cannot be effectively guaranteed. Online teaching requires students to have good learning habits, autonomous learning ability and sufficient learning motivation. Due to the space and time distance between teachers and students, 73.2% of teachers think that the biggest difficulty in online teaching is that they cannot control and manage their classroom easily and have no idea about students' learning effect. (Liu, 2020)

A research named Suggestion about Online Teaching shows a dramatic consensus between different teachers, that is students' suggestion needs to be taken seriously. It also shows that the characteristics of online teaching put forward higher requirements for students' learning ability and learning habits. (Zheng, Xie & Wang, 2020) In traditional classroom, students can abide by classroom discipline and complete learning tasks under the supervision of teachers. Without teachers' eyes, students tend to truancy and do not focus on class. The online teaching during the epidemic makes teachers realize deeply the importance of cultivating students' autonomous learning ability.

### **3. Reflections on improving of teacher's digital literacy in vocational school in the post COVID-19 Era**

There is no doubt that the epidemic will eventually finish, and the reform of teaching methods is the new trend, "Online + offline" hybrid teaching will become the "new normal". The deep integration of information technology and vocational education is not only the key work of vocational education reform all over the world including China, but also the inevitable trend of international vocational education. Exploring the digital literature of vocational education teachers in the post epidemic period is of far-reaching significance to the professional development of vocational teachers.

#### **Firstly, technical support----- accelerate the improvement of technical construction such as network platform and online services.**

Technology is the foundation. Without the support of hardware and technology, any theoretical exploration on online education will not work. The information technology situation and environment of school provide strong external support for online education. Some studies show that the stability and fluency of the network environment has a significant impact on the effectiveness of online teaching in addition to students' academic participation and teachers' teaching methods. Online teaching has a strong dependence on network stability. Technical factors such as network platform have become the second factor to improve online teaching. (Bao, Chen & Wang, 2021) Moreover, digital resources and information security system of school have a significant positive correlation with the quality of teachers' information-based teaching and the level of students' information literacy. If the quantity and quality of computer and other hardware equipment in the school can meet teachers' and students' needs, they can use digital resources according to their need, so as to improve their ability of information technology equipment and promote the improvement of online teaching efficiency and quality. [9] At the same time, falling into the dilemma of lack of guarantee of computer equipment and network conditions will put teachers and students in a disadvantageous position in the online teaching environment, so as to weaken the effectiveness of online teaching. Therefore, vocational schools should pay attention to the construction and increase the investment in the construction of information-based campus.

#### **Secondly, teachers' digital literacy-----strengthen teachers' skills in using high-quality digital resources and platforms**

It is found that teachers have a high sense of identity with the necessity of teaching reform in the digital environment; Teachers have the basic skills of using digital tools and technology is no longer the "gap barrier" that restricts teachers from carrying out

online teaching; However, teachers still lack ability to carry out effective teaching under the background of “Internet + education”, which is still the core factor that restricts the development of online teaching. (Han & Ge, 2018) Therefore, teachers should seize the opportunity to improve their online teaching ability. Colleges should help teachers adjust the adaptability of online courses at the three levels: learning support, curriculum structure and interactive teaching. Teacher training and the support of professional and technical teams are necessary. During the epidemic period, most of the online teaching courses only simply relocated the traditional courses to the network platform, and did not carry out corresponding adjustment for the online teaching situation. Teachers generally lack online teaching experience and educational technology team support. Therefore, colleges need to carry out corresponding course training and establish professional technology support teams to provide clear guidance for teachers in order to ensure the effectiveness of online teaching and organic integration with online teaching.

### **Thirdly, students' digital literacy-----pay attention to developing students' digital literacy**

Future education emphasizes the cultivation of digital literacy, autonomous learning and social participation. Firstly, colleges and universities should strategically improve students' autonomous learning ability and strengthen students' autonomous academic participation based on professional counseling. For example, a professional counseling center can provide students with consulting services in terms of time management and learning efficiency, and professional and targeted support services for students in need. Secondly, teachers' good digital literacy can be used as an example for students to develop digital literacy. Therefore, teachers should collective and joint research on teaching, such as reflecting on the problems of online teaching, paying attention to students' understanding of teaching objectives, the rationality of task division of learning groups, the innovation of teaching content. By improving teachers' digital literacy, students will learn from their teachers and will solve emergency in digital environment successfully.

### **Forth, practical community----- build a practical community of online teaching and pay attention to the common development of teachers in vocational colleges**

The value of “Peer Effect” to teachers' development should be payed attention. Colleagues who are good at using new technology can help other teachers effectively. Therefore, a innovative teaching teams which do well in online teaching should share their experience with others. Secondly, practical community can play the exemplary role of high-performance teachers. They have a strong sense of self-confidence and work achievement and can quickly adapt to online teaching which form a

demonstration effect on other teachers. Thirdly, we need to strengthen the online teaching training of front-line teachers, so that more teachers can overcome technical obstacles and experience the usefulness of online teaching, realizing the transformation from novice to excellent online teaching experts.

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# **Discussion on the Standards of Interactively-stipulated Standards for Academic Quality of Vocational Education**

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## **Abstract**

Curriculum standards and academic quality standards are the vocational educational quality standards made by vocational schools. To promote the high-quality development of vocational education, we shall regulate the standards of the relevant curriculum and academic quality, and pay special attention to the implementation of them in teaching and learning. Influenced by many factors such as policies, theoretical researches and practical elements, the making of the two standards are not systematic, with low-degree relevance and insufficient attention to the academic achievements of students, negatively affecting the expected outcome of the two standards. Viewed from the perspective of educational connection, schools of different levels have stipulated rules, objectives and requirements based on the standards of vocational education, established an interactive curriculum-standard-based mechanism for assessing academic quality of vocational education. In this way, they have optimized the designing of learning achievements in the three modes of curriculum standards, which have guided the making of academic quality standards in a more scientific and systematic way. The curriculum standards and academic quality standards made in this way is able to improve the academic evaluation work such as credit recognition and transfer of the relevant courses of vocational education, and better lay the foundation and guarantee of the run-through personnel cultivation mechanism.

**Key words:** vocational schools; curriculum standards; academic quality standards; learning achievements

After the 1980s, the core of educational reform in some countries has changed from input control into output control. The results of the research by G. Whity et al. on many western countries such as the Great Britain and the USA have shown that although they have their own cultural traditions, political systems and educational reform modes, yet all of them have emphasized that educational quality shall be improved through standards. The idea of educational quality improvement based on

standards has represented itself in the fields of vocational education. High standards are the foundation for high-quality development. With the layout of educational

development in new era, China has now been strengthening the vocational education at undergraduate level to improve the modern vocational educational system. Although educational policy-makers have realized that the construction of standardized systems has played a basic and guaranteeing role in improving the quality of vocational education and establishing a "run-through" personnel cultivation mechanism, and, as a result, a series of policies has been made to promote the construction of the standardized system of vocational education, yet the theoretical nature and researching depths of the system have not been fully excavated: There are few researching results on curriculum standards (especially academic quality standards), with no systematic structure accordingly. It is in urgent need that the methods and requirements for curriculum standards and academic quality standards shall be deeply explored from the theoretical perspective.

### **1. Necessity of Interactively-stipulated Standards for Academic Quality of Vocational Education**

Currently the vocational educational curriculum standards in China do not include academic quality standards in general. "Academic quality standards set up requirements for students of different ages or in different school years in achieving certain academic goals, which should belong to the types of proficiency evaluation standards. They are the rules assessing the academic achievements of students, and the standards made according to the national-level curriculum standards". Academic quality standards generally include the following four parts: "performance-based standards", "evaluation methods and suggestions", "evaluation samples" and "students' works and their scores". Curriculum standards and academic quality standards are the two intimately-connected activities during the curriculum development process of vocational education. Curriculum developers have been optimizing students' design of learning achievements in curriculum standards, and it is both necessary and urgent to stipulate academic quality standards based on curriculum objectives and content. Firstly, it has met the needs for improving the working mechanisms of improving the certification, accumulation and transfer of learning achievements; Secondly, it has met the needs for schools to unify the different quality standards of vocational education. Now China has formed three typical stipulating modes for vocational educational curriculum standards: "Certification mode", "qualification mode" and "working mode". The establishment of Interactively-stipulated academic quality standard mechanism is able to effectively guide schools to use the relevant theories of curriculum development to make their own school-based standards according to the general rules and requirements of standard-making, and also to accelerate schools' pace of stipulating systematic standards with high-level relatedness; Thirdly, it has

met the needs for schools to make innovation in stipulating school-based standards. To establish high-standard quality management system, high-level vocational schools shall further optimize the content and structure of the three modes of curriculum standards and the relevant academic quality standards, strengthening their functions, and also make innovation in the theories of vocational curriculum development, and academic evaluation, improve the standard-making level, and furthermore, demonstrating the distinctive features and quality of school-based standard systems.

## **2.Rationality of Interactively-stipulated Standards for Academic Quality of Vocational Education**

Curriculum standards and academic quality standards are important parts of vocational educational quality standards. The two shall be coordinated horizontally and vertically with one another. Firstly, the interactive stipulation of the two standards is able to precisely demonstrate and give feedbacks on the vertical connection between the two standards to accelerate the vertical linking of all elements within the system of vocational education; Secondly, it perfectly conforms to the principle of consistency in teaching, learning and evaluation. Evaluation is the effective means of implementing standards and improving quality. The prerequisite of conducting academic evaluation based on academic quality standards is to design the two standards within one system, and then to effectively implement the curriculum standards to achieve the consistency in teaching, learning and evaluating. Thirdly, it meets the requirements of the general view of vocational educational quality, which pays special attention to "output". Traditional vocational educational curriculum standards in China have only pay special attention to curriculum content introduction, lacking the detailed description of learning output of curriculum content. "learning output", as well as curriculum objectives or teaching objectives, has briefly demonstrated the difference in students' expected learning outcomes, which are, conversely, realizing teaching objectives, and also the important step for curriculum content and objectives to turn into standards. Curriculum objectives have emphasized the specificity and measurability of learning achievements, and also paid special attention to the sophistication, process-based nature, and integrity of learning achievements. The standards of content have added the description of "learning output", offering reference for the change of content-based standards into "performance-based standards (to guide performance-based evaluation)". The two standards have high-level integrity and relevance, maintaining the orientation and feasibility of vocational education, and keeping the consistency in teaching objectives, behavioral objectives and performance-based objectives.

### **3. Analysis on the Practical Problems of Interactively-stipulated Standards for Academic Quality of Vocational Education**

Currently, vocational schools have implemented the "run-through" personnel cultivation mode, yet there is low-degree content relevance between curriculum standards and academic quality standards. Both of them have insufficient attention to students' learning output, and the standards have weak binding force.

#### **1. Practical Problems**

Firstly, the content of academic quality standards is vague and overly general; Secondly, curriculum standards and academic quality standards lack vertical coordination; Thirdly, the stipulation of curriculum standards and academic quality standards is not systematic, with little relevance and low-degree binding force.

#### **2. Influencing Factors**

Viewed from the internal and external factors influencing standard stipulation, we have found the following reasons: Firstly, the key influencing factor: Vocational educational standards and quality evaluation policies are not systematic, weakening the guiding requirements of the relevant policies and the regulating requirements of educational connections. Secondly, the direct influencing factor: The theoretical researches are not paid enough attention. Thirdly, the fundamental influencing factor: Lacking management mechanism of well-coordinated, interactively-stipulated and school-based vocational educational standards: The management mechanism of the integrity of teaching, learning and evaluation is still underdeveloped.

### **4. Strategies of Interactively-stipulated Standards for Academic Quality of Vocational Education**

To improve the standardization, objectivity and progressiveness level of standard stipulation, we can take actions according to the following three aspects to interactively stipulate the standards of academic quality of vocational education based on the rules of standard stipulation and features of the standards of quality of vocational education.

1. Establishing the value orientation and basic principles of interactively-stipulated standards for academic quality of vocational education

The value orientation of standards forms the fundamental objective of standard stipulation, deciding the direction of the stipulation of curriculum standards and academic quality standards, and the selection and quality of the relevant content.

We shall adhere to the basic principles of teaching students in accordance with their aptitude, unity of knowing and doing, and advancing in regular order to interactively stipulate the standards for academic quality of vocational education. With the attainment-based value orientation kept in mind, we shall also adhere to the principles of science-and-regulation-guidance, objectivity, and feasibility.

### 2.Optimizing and innovating the stipulation of standards of curriculum of vocational education

Firstly, we shall further clarify the regulations and requirements of stipulation of curriculum standards, rationalize the design of learning output plans, and pay special attention to the main difficulty: How to design a reasonable plan for designing students' learning achievements according to the content standards in the curriculum standard guided by "working mode". Viewed from the perspective of feasibility, the curriculum objectives in this mode puts great emphasis on the cultivation of vocational acting abilities: The cognitive elements and acquisition behaviors included are able to be transformed into the sophisticated cognitive tasks in learning achievements, meanwhile, designers are also able to consider other aspects such as cognitive and emotional achievements as a whole. Besides, we shall also make innovation in the theory of curriculum development of vocational education, and optimize the content and structure design of curriculum standards. We shall use technical advantages in this era of high-level intelligence and improve the macroscopic content standards, to offer scientific evidence to the standard stipulation of curriculum objectives and the design of relevant microscopic content. We shall optimize the role analysis technology and knowledge analysis technology in the theory of development of curriculum of vocational education, in order to precisely learn about social needs and the personalized needs of learners, to accurately describe the role knowledge system, to improve the design of student-centered curriculum resources, and enhance the adaptability and proactivity of students in learning output.

### 3.Clarifying the technical methods and requirements of interactively-stipulated standards for academic quality of vocational education

The key factors of stipulating academic quality standards according to curriculum standards are to decide the performing standards and the corresponding descriptions, to specify the content of learning output, to build a clarified hierarchical index system with the lowest level of index as performance, and to pay special attention to the description of inspection points and scoring standards. The stipulation of performing standards and descriptions shall be conducted according to the requirements of curriculum objectives, content standards and implementing conditions, including the following three steps: Firstly, curriculum developers fragment the comparatively

vague learning outputs according to the actual teaching and learning situations and the requirements of curriculum objectives and learning content from the perspectives of target index, process index and condition index, to form an index set of academic quality standards comprised of performing index. Secondly, we shall determine the index weight in the performing index set. Thirdly, we shall decide and describe the performing level of the performing index. Besides, we shall also make evaluation samples according to the evaluation standard types and the relevant requirements of section-based standard, comment-based standard, scale-based standard, and membership-based standard, etc., and work out detailed scoring rules, etc.

To interactively stipulate the standards for academic quality of vocational education, apart from demonstrating the interactive nature in the internal links of standard stipulation, we shall also establish the interactive and binding mechanism for stipulating school-based standards in the three levels of national-level governments, local governments and schools, to guide more vocational schools in interactively stipulating higher-level school-based standards and to promote the systematic and scientific change in the construction of standards of quality of vocational education.

# **Analysis of a Reality of Awareness of Issues for Human Resource Training by Specialized Training Colleges Teachers -Focusing on a Scene in a Non-Cognitive Skill's Development-**

## **1.Introduction**

### **(1) Today's situation of specialized training college in Japan**

In Japan, higher vocational education is implemented in university, junior college, technical college and specialized training college. Specialized training college accepts those who have completed upper secondary education and implement vocational education for more than a year and this college is located level 5 in ISCED. This college was institutionalized in 1975 but it have not been legally poisoned like other "regular school" (for example: university, junior college, and technical college) (Gakko in Japan) . However, Specialized training college has implemented vocational education through responding to needs in industry by using the flexible institutional rule comparing regular school ones. After that, a part of the college's curriculum has been authorized as vocational professional course by Ministry of Education, Culture, Sports, Science and Technology (MEXT) since 2013.

### **(2) The needs of improvement of quality and competencies in specialized training college teacher**

Remarkable theme in the college's policy is to improve teacher's quality and competencies. The reason is caused by their institutionalized stipulations: Uegami and Takimoto (2017) stated a lack of the college teacher's facility for training whereas primary and secondary education teacher training is prepared, uniform standards for a degree and professional ability in teacher recruitment and a chance of study and training. In response to this situation, in recent years, MEXT recommends an improvement of teacher's quality and competencies and develops training program for teachers.

### **(3) The point of previous research of specialized training college teacher**

There's some research of the college teacher. Inenaga and Yoshimoto (2018) considered the characteristics of the organization of short-term higher education

teacher and classified specialized training college by their career. Uegami and Takimoto (above- mentioned) pointed out an importance of using life-history research style to investigate a realities of college teacher because their identity is so various comparing primary and secondary education teacher's ones. Tsuda (2012) studied a qualification for college from the viewpoint that it should be upgraded to a qualification on the level of a university teacher. These researches clarified a reality of teacher's career and the characteristics, however, a study focusing on teacher's quality and competencies for education for student is a few.

#### **(4) A research question of this article**

The author has investigated specialized training college education as an executive committee member of the MEXT's consignment project since 2018 and developed some training program for teachers. These surveys clarified that college has taught not only cognitive skills like expert knowledges and technical skills but also cognitive skills like a cooperativeness and communication skill and so on. A "non-cognitive skill" concept has been paid attention by a change of a social structure since a second half of the 1990s in Japan. According to Japan Institute of Life-long Learning (2018), industrial and educational circles came to emphasize not only cognitive skills (= "traditional" academic ability) aimed to acquire knowledges and skills but non-cognitive skills (= "new" ability) taking a serious view a use of knowledges and skills and include under "key-competency" as non-cognitive skills. In addition, the institute stated training for non-cognitive skill has been requested for primary and secondary school and university. On the other hand, non-cognitive skills have been trained by specialized training college for a long time. However, training for skills in the college haven't enough been paid attention.

Therefore, focusing on these skills is important to clarify a reality of colleges teacher's quality and competency. So, the purpose of this article is to investigate educational awareness of issues in college teacher focusing on a scene in non-cognitive skills development by interview data obtained in above survey.

### **2.A Trend of a Non-cognitive Skill**

#### **(1) The meaning of "non-cognitive skill" and the importance in today's Japanese society**

Japan Institute of Life-long Learning (2018) explained that a non-cognitive skill is 21 Century Skill.

21 Century skill is a concept established by Assessment & Teaching of 21st Century Skills (ATC21S) and they stated this skill is necessary to be actively involved

in society since 21 century which have been developed in IT technology and globalization. In Japan, each ministry and agency set an image of ability and skill related with 21century skill. For example, the Cabinet Office offered “ Ningen Ryoku (human resoruce)” , the Ministry of Economy, trade and Industry announced “Shakaijin Kisoryoku (basic skills for working with a variety of people)” and MEXT stated “Ikiru Chikara(living powers)”. Given above Institute of Life Long Learning investigated 10 offered opinions including the above abilities and extracted 19 abilities’ and skill’s factors. As a result, they made clear that 3 factors correspond to a cognitive skill, and 16 factors come under a non-cognitive skill. They showed 19 abilities and skills as A table 1.

<b>Cognitive skill</b>	<b>(1) the basic knowledge of a subject</b>		
	<b>(2) the basic knowledge and skill</b>		
	<b>(3) specialization and expert knowledge</b>		
<b>Non-cognitive skill</b>	<b>(4) problem-solving ability</b>	<b>(10) self-esteem</b>	<b>(16) sense of morality</b>
	<b>(5) the ability of to think critically</b>	<b>(11) executive ability</b>	<b>(17) ethical view</b>
	<b>(6) cooperativeness</b>	<b>(12) leadership</b>	<b>(18) norm consciousness</b>
	<b>(7) communication ability</b>	<b>(13) creativity</b>	<b>(19) publicness</b>
	<b>(8) independence</b>	<b>(14) spirit of inquiry</b>	
	<b>(9) self-control skill</b>	<b>(15) empathy</b>	

Table 1: Classification of abilities and skills

Osio Atsushi (2021) explained that a cognitive skill is a measurable skill by an intelligence test and it is the basic knowledge of a subject and psychological function to be able to learn and understand about a fixed matter in a certain term, and get the way to problem-solution and answer correctly for many problems. On the other hand, He stated that a non-cognitive skill is a pattern of thinking, feeling and behavior that each person has. In addition, he said that these skills are psychological characteristics not completely different things but being related with each other and cognitive skill is difficult to change by an environment and education because it results from hereditary factors. However, a non-cognitive skill is variable. Therefore, training non-cognitive skill is remarkable for education today.

## **(2) A relation non-cognitive skills and special training college in Japan**

Educational policies also locate getting non-cognitive skill today and special training colleges one is the same. However, in fact, what do special training college graduates think about getting a non-cognitive skill? Educational Research Center in Benesse Cooperation implemented an investigation about thinking back learning in special training college for 3771 graduates in 2016 and it was clear that 70% graduates are convinced that could get non-cognitive skills (for example, cooperativeness,

diligence and so on) in college.

Special training colleges education have been ever considered as educational field for teaching specific vocational knowledge and skills in a narrow sense not including a pattern of thinking, feeling and behavior. However, in fact, this college educates non-cognitive skills and graduates realize of getting skills. On the other hand, there are few studies is these points. Therefore, first, the author clarifies a reality of awareness in a scene of training non-cognitive skills in this study on as the following.

### **(3) Outline of data using in this article**

The author uses some interview data by having been get by investigates of colleges' teacher in Outsourced business by MEXT. The author has been taken part the survey as a member of a working group and implemented interview since 2018. Especially, in 2019-2020, the group enforced action-research about a non-cognitive skill's development for students by colleges' teachers. Using a data got by these researches is permitted by an interested people. These researches were implemented colleges training professional in the business world as the following: a beautician, hotelman and bridal staff. In this study, the author uses only a data in beauty colleges for training a beautician the author was involved energetically as an investigator. Number of colleges surveyed is 3:X, Y, and Z college. And, a survey respondent is each person in charge educational affairs and interested people. An outline of 3 colleges is as following:

#### X college

This college is located the Kyushu district. Teachers try to train talented person who are easy to educate in a beauty salon and develop an obedientness, communication skill, consideration for salon's staffs and ability to think. The author interviewed 3 teachers in September 2019.

#### Y college

This college is located the Chugoku distinct. Teachers emphasize to train continuity, communication skill, watch and careful and thoughtful attention required to be a beautician. The author investigated 2 teachers and the chief in September and October 2019.

#### Z college

This college is located the Kansai distinct. Teachers raise an aim-"having been 3 years since a student became a beautician" and have students experience a salon

work implementing actually in a work place. The author did interviews 2 teachers in October and November 2020.

### **3.Awareness of issues for training non-cognitive skills having college's teachers**

This section shows awareness of issues having teachers on focusing 4 scenes as the following (1)-(4).

#### **(1) a scene of verbalization of abilities**

College's teachers train and educate non-cognitive skills in real terms as mentioned in section 2, however, they don't always express and educate in words because a verbalization of non-cognitive skill is difficult. X college's teacher said difficulties to train skills and abilities in educational institution as following:

*“In the way of training and education for beauticians in a workplace is coaching, but college's education has to been offered by teaching. In coaching, we can individually give guidance that suits new beautician personality in a workplace because the subject is a few. However, we have to do teaching in a college because we educate many students, so we should tell so that most of them can understand. So, it's necessary to change the wording at work and college. “*

From this remark, this teacher recognized teaching in college is different from coaching in a workplace and teaching is difficult. On the other hand, Z college's teachers avoid teaching too much because they recognized it is important to watch and imitate skills through nonverbal communication. It is seemed that Z college's teachers thought that teaching too much by verbal communication brings for students who can move only according to a manual.

If so, don't colleges train and educate through verbal communication? Yes, they do. Each college expresses the image of human resources and abilities which should be developed in the department in words that are easy for students to understand. For example, Y colleges attached continuity, watch and careful and thoughtful attention because cosmeticians have to keep working while having own aim based on the fact that they can't work the way you want in the real world and notice the customer's desire from their perspective. These images of human resources and abilities seem to include non-cognitive skills.

Then, what does it mean to extract non-cognitive abilities from these images and the incorporate them into the curriculum? The author implemented action-research for Y college 2019 with teachers and researchers about incorporating non-cognitive skills training into a class. Researchers including the author abstracted “problem-solving ability” and “self-control skill” into the image of human resources and abilities and

made rubric evaluation table reflected the goals and evaluation criteria for these non-cognitive abilities in a volunteer activity scheduled to start as a subject next year. We are confident that this practice has helped clarify and assess the non-cognitive skills that this college develops. The above survey results are just an example, but non-cognitive skills can be verbalized in department through this process, and teachers can share the image of skills by words. Therefore, each college verbalizes non-cognitive skills to a certain extent, if not being completely clear.

## **(2) a scene of curriculum formation by teachers**

As mentioned before, each college teacher verbalizes abilities to be developed to a certain extent. However, not all teachers understand the importance of abilities. For example, Z college teacher who teach a lesson for a state examination gives guidance extremely but he doesn't enough understand the image of talented person in the college and relation with college's curriculum. In addition, Y college has also difficulties: Y college teacher stated full-time teachers daily have communication in a staff meeting but it's difficult to share the image of personnel and abilities to develop with part-time instructor. Full-time teachers desire part-time teachers don't enough train non-cognitive skills.

## **(3)a scene of explanation of meaning of curriculum and results valuation for students**

Then, what problem does teachers have in their class? First, it's caused the situation that some teacher cannot explain meaning of every lesson for student by reason that he/she doesn't enough understand a basic concept of abilities should be trained in the college. Z college teacher stated as the following:

*“Many students desire to take a lesson they like only. For example, this college has a makeup lesson for all students desiring beauty-related job but some male student wanting to be a beautician cannot enough understand why a male student has to learn makeup and a beautician works by cutting hair must makeup.”*

In this case, if all teachers understand a basic of concept of abilities should be trained in the college, they can explain this student a meaning of the lesson. However, in fact, some teacher cannot tell students about the thing because he/she doesn't enough recognize a relation the image of abilities and skills should be trained and curriculum.

Second, there's awareness of issues in results evaluation for students. Y college full-time teachers evaluate student's skills that be obtained in a lesson considering the image of abilities and skills in the college. However, part-time instructors trend not

enough to think it and often evaluate by their subjective viewpoint. Therefore, students sometimes cannot accept their subjective evaluation and have a suspicion to their evaluation. Full time teachers often explain for them while gathering the intent of their evaluation but students don't always understand it.

For the above, Y college full-time teachers recognize a matter that they share the image of abilities and skills the college should be trained with part-time instructors and cannot evaluate fairly for students in the whole college.

#### **(4) a scene of training skills in a practical training**

Finally, (4) shows a cognition of problem about training skills in a practical training. Interview for special training college teachers often touch on a topic about sensitivity, deftness and awkwardness. For example, Y college chief stated that a sense isn't caused by nature and skills and abilities including word that is a "sense" should exactly educate. He thought abilities that students should get have to be interpreted as problem of not a natural sense but skills improved by training.

For other case, Z college teacher stated how to evaluate for "skillful" and "unskillful" students as following:

*"Skills can be developed by repeating a practice. A repeating practice brings students to get an ability to watch and think things from various angles. Unskillful students trend to obtain this ability but skillful ones don't enough have the ability. In addition, unskillful students can teach skills for a junior person because they analyze skills through repeating a practice, however, skillful students cannot do because they don't repeat practices comparing with unskillful ones."*

A remark mentioned above, unskillful students obtain a non-cognitive skill (= an ability to think) through repeating technical skill's practice. On the contrary, skillful students who don't repeat practices may not acquire a non-cognitive skill.

#### **4. Conclusion**

A purpose of this study was to clarify a reality of awareness of issues for human resource training by focusing on a development of non-cognitive skills. As a result, 3 points was clear. First, abilities and skills that should be trained in each college is expressed by words to some extent, however, the final goal and basis for evaluation isn't clear and non-cognitive skills don't enough are expressed by a verbal communication. As a result, it's difficult for some teachers to understand abilities and skills in the college exactly and share these skills with part-time instructors.

Second, college teachers recognized a problem in a scene of lessons for students because teachers don't enough express the image of abilities and skills should be trained and share by words. Concretely, some teacher can't explain the importance of lessons for some student who doesn't understand a meaning of lessons and student's abilities and skills are evaluated by teacher's subjective viewpoint.

Third, it's difficult to train abilities and skills which could be ordinally developed by not recognizing the image of human resources clearly. Therefore, there are problems teachers can't enough train for students by regarding non-cognitive skills as sense bred in the bone. In addition, they can't have both skillful and unskillful students grow while corresponding to lack of abilities and skills each other.

It's clear that special training colleges teachers educate and train non-cognitive skills substantially, however, sharing thorough verbal communication is not always done. Problem about training skills caused ambiguity in image of abilities and skill should be trained in a college. However, this study focused only on vocational education for training beautician and couldn't consider other vocation. And this research made clear cognition of teachers in charge of educational affairs but other teachers one couldn't clarify. These problems have to be solved in the future.

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Analysis of a Reality of Awareness of Issues for Human Resource Training by Specialized Training Colleges Teachers-Focusing on a Scene in a Non-Cognitive Skill's Development-

**BACK**

# **The recognition of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea**

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## **Abstract**

*The purpose of this study is to investigate the differing recognitions of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea. To achieve this, a survey was conducted through an online questionnaire system, targeting principals and teachers at 506 schools. A basic statistical analysis and a t-test were conducted using the SPSS 23.0 for Windows program. The main research results are as follows. First, it is necessary for the both principals and teachers working in vocational high schools to utilize the industry sector teacher or affiliated teacher industry sector system to enhance their ability in the fields of information and communication, electricity, electronics, culture, art, design, broadcasting, and machinery. In particular, it is especially necessary in the areas that require the sharing of field experience or practical guidance rather than theoretical lectures. Second, despite the high demand for industrial-educational adjunct teachers in vocational high schools, both teachers and managers recognize the challenges of securing such manpower at schools and the hiring difficulties associated with low wages and school locations. Third, both teachers and principals have a low awareness regarding the necessity for specialists to be qualified as teachers to enhance the utilization of industry sector experts in vocational high schools and align with the equality with the current teacher training system. Fourth, both teachers and principals recognize that it is appropriate to introduce a special admission program to teacher training institutes for industry sector experts and grant them extra points when selecting the teachers in order to expand the participation of industry sector experts in vocational high schools in addition to hiring industry adjunct teachers.*

**Keywords** vocational high schools · principal · teacher · industry sector experts · industrial-educational adjunct teachers

## Introduction

Efforts to improve the industrial field of secondary vocational education help students acquire practical skills in the field, increase job satisfaction and field adaptability after employment, and resolve skills mismatches through curriculum development that reflects industrial field demands. Ultimately, such efforts are expected to cultivate excellent industrial manpower and contribute to the enhancement of national competitiveness. To achieve this, developed countries are promoting various policies and systems concerning teachers to enhance the practical skills of vocational education (Cedefop & ETF, 2020; European Commission, 2020; Kamylylis & Devine, 2015; Kluzer

& Priego, 2018). However, secondary vocational education in Korea is provided in specialized high schools and vocational high schools called Meister high schools. Problems related to field expertise such as the lack of functional competency of teachers and poor teacher training systems have been continuously raised. To solve these problems, various improvement measures related to teacher training, and qualifications have been suggested (Kim, 2018; Kim et al., 2001; Jang et al., 2014; Choi et al., 2008) but have not effectively been applied to actual school sites. This shows that there are still limitations to the practicality of the vocational high school curriculum.

As an effort to improve this condition, industry field experts are being used as teachers through a system called 'industrial-educational adjunct teachers' in Korea; however, this has been subject to criticism. Such criticism includes the insufficient teaching skills of industrial-educational adjunct teachers and their ability to guide students, a lack of screening processes for teachers' qualities, and an insufficient budget and condition for securing good resources (Kim et al., 2018; Byun et al., 2012; Jang & Byun, 2016). In addition, since industrial-educational adjunct teachers do not have official qualifications, they cannot take charge of independent classes under the Korean laws and regulations. As a result, they are used as guest lecturers paid per hour or as team teachers supporting the existing teachers.

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Accordingly, in order to respond to changes in the new industry and labor market, the Ministry of Education of Korea proposed an active reorganization plan in 2018. This included the development of a system to grant official teacher qualifications to industrial-educational adjunct teachers and allow independent classes, limited to new industries. However, this was not implemented due to an opposition from the existing teachers. Recently, in Korea, a related policy has been implemented to introduce the credit system (Ministry of Education in Korea, 2017), which is a curriculum completion and operation system that allows students to select and complete various subjects according to their career paths and graduate when the cumulative credits reach the standard (Ministry of Education in Korea, 2017). It is expected that additional diverse subjects will be offered under this plan, depending on the students' needs. Therefore, it is expected that there will be a greater demand for industry sector experts, such as industrial-educational adjunct teachers, with field experience. As such, various plans need to be developed to improve the utilization of industrial-educational adjunct teachers.

Accordingly, the purpose of this study is to investigate the differing recognitions of the existing principals and teachers on the use of external industry sector experts. It is expected that insights can be obtained into the consideration of industrial-educational adjunct teachers in this regard.

## **Theoretical background**

### **Korea's pre-service program and qualification for vocational high school teachers**

Vocational high schools in Korea include specialized high schools and Meister high schools. They and are divided into schools providing general subjects that teach basic knowledge and specialized subjects that teach specialized contents for each major. Among them, teachers in specialized subjects are trained in various ways based on the relevant laws and regulations. The vocational high school teacher training system has been in operation for a long period of time and has undergone many changes. When the law on the training of teachers was amended in 1990, the hiring system for teachers was also changed. Due to these changes, since 1992, the path of acquiring teacher qualifications has been diversified to include teaching profession courses at universities of education, colleges of education, and general universities. A hiring exam is administered for the hiring of teachers in public schools, such that the educational path has become irrelevant in the hiring process. More than half of the vocational high school teachers are cultivated through teaching courses at general universities. Ahn et al. (2020) identified the scale of teacher training for vocational high schools and showed that teacher training courses are being conducted in the specialized subjects of machinery and metal; commercial information; plant resources

and landscape; electricity, electronics, and communication; information and computer; chemical engineering and textile; and environment at the College of Education. However, training courses in the specialized subjects of physical education, arts such as design and photography, and refrigeration and institutions are insufficient.

Non-examination tests are subdivided into major courses and teaching credits, grade standards, teaching aptitude and personality tests, first aid and CPR, industrial experience field practice, and licenses. This is applicable only to the acquisition of qualifications for teachers in specialized subjects in the industrial field. Licenses are also used as a standard for acquiring certain teacher qualifications such as for nutrition and public health teachers. In the case of major courses, a total of 50 credits must be completed, including 21 credits or more in the basic courses that correspond to those indicated in the teacher's certificate. Marked subjects refer to specialized subjects that can be taught with a teacher's license. According to the Ministry of Education in 2020, there are 32 marked subjects that correspond to specialized subjects, such as design, crafts, machinery, electricity, electronics, and communication. Studies on the teaching profession are divided into three sub-elements: teaching profession theory, teaching knowledge, and educational practice. When a total of 22 credits are completed, the passing criteria is met. This is achieved by completing 12 credits or more of teaching profession theory, six or more of teaching knowledge, and four or more of educational practice. If candidates meet all of the above criteria for passing the non-examination test, they can acquire teaching certificates in a specialized subject that corresponds to their major subjects.

Research related to vocational high school teacher training and qualification testing is being continuously conducted in Korea, many of which have suggested various problems in the teacher training process and appointment system and identified subjects and suggestions for improvement.

Kim et al. (2001) identified difficulties in securing excellent pre-service teachers due to problems in training vocational high school teachers, inappropriate teacher training curriculums and teaching methods, and imbalance in the supply and demand of teachers. As a way to improve this, Kim (2001) proposed the specialization of training teachers in protected industry sectors or in subjects with high demand at a national level. Jang et al. (2014) pointed out the problems of training teachers in specialized subjects which include the operation of integrated teaching courses, the limitations of offering new demand-labeled subjects due to frequent department convergence or department integration, and the development of teacher competency. Among the problems highlighted, is that it is necessary to review the mandatory

industrial field practice when nurturing professional subject teachers in all fields, given that recognition of the problem was high in the majority of fields other than industrial field training. Choi et al. (2008) identified the problems of teacher training, hiring difficulties, and teachers' professionalism in engineering, which may be due to the integration of teaching qualifications in the industrial field, and suggested improvement measures. As a major improvement plan, it was emphasized that the integrated labeling subjects should be treated separately. The study of Kim and Cha (2001) identified that the problems of teacher training and appointment were due to the operation of integrated labeled courses, and suggested a plan to separate establish new courses. Also, in order to train teachers who can be in charge of subjects, the use of the linked major system to complete related subjects, rather than create separate majors at university was suggested. Kim et al. (2016) conducted a study on how to improve the laws related to teachers based on the NCS-based curriculum that was fully introduced in vocational high schools in the 2015 revised curriculum. The key result was the presentation of a plan to provide opportunities for industry-based teachers to work in the educational field by strengthening the qualifications of teachers in charge of specialized subjects and introducing a flexible teacher recruitment system to attract manpower with extensive field experience. In relation to the strengthening of the practical competency of teachers, it was also suggested that practical and experimental evaluations be compulsory during appointment, and preferential treatment for industrial careers and related qualifications be provided (Kim, 2018).

In summary, regarding the issuance of teacher qualifications for specialized subjects, there are difficulties in hiring teachers and teaching subjects in the field due to the integration of subjects. Discussions regarding the field expertise of teachers in specialized subjects are progressively conducted. In order to solve these difficulties, the suggestion is to separate newly established integrated courses, to conduct practical evaluations during appointments, and to perform mandatory field training in industries. However, although the above improvement measures have been continuously discussed, they are not well applied in the actual field and there are limitations in operating new industry-related courses. Therefore, it is necessary for the teacher training system and the subject matter to be operated more flexibly so that students can acquire knowledge and skills in newly emerging industries. In addition, measures to resolve the low field expertise of vocational high school teachers should also be devised.

### **Korea's 'Industrial-Educational Adjunct Teacher' system and its utilization**

Vocational high school students are placed into the field after graduation. In this respect, low field expertise raised as a problem for vocational high school teachers can directly or indirectly negatively affect students. To solve this problem, Korea established the system of industrial-educational adjunct teacher in 1997. An industrial-educational adjunct teacher has worked in industries, businesses, and arts/physical fields, who has certain qualifications, concurrently instructs and instructs subjects in schools similar to those in charge of the field (Lee & Choi, 2005). The type, appointment, treatment, and quota of industrial-educational adjunct teachers are suggested in the laws related to vocational high school teachers. Therefore, industrial-educational adjunct teachers can be hired as school teachers on a part-time or contractual basis at schools based on their work experience in industries, etc. In order to become an industrial-educational adjunct teacher, certain qualification standards must be met. They must have an academic background at a junior college or higher, or as an industrial engineer or higher in the technical/functional field according to the National Technical Qualification Act, possess a certificate in business services or a specialized office field, must have engaged in international and domestic competitions (in the field of culture, arts, physical education, or other skills), must meet the requirements for a prize winner and have at least three years of work experience in a related field.

In Korea, among the qualification standards for industrial-educational adjunct teachers, there is a plan to utilize industrial-educational adjunct teachers for winners of international and domestic competitions (in the fields of culture, arts, sports, and skills). This is to prepare a path for awarding teachers' qualifications by completing minimum majors and teaching courses based on the expertise of winning international competitions in the field of physical education. This was called the special training course for teachers in the field of physical education, and the winner of the international competition in the field of physical education can complete the special training course for teachers after being appointed as an industrial-educational adjunct teacher for one year. At this time, 18 credits must be completed through the special teacher training course, which is converted into 270 hours. All students are required to complete 10 credits (150 hours) during the semester and 8 credits (120 hours) for group training during vacation. This will recognize expertise in the field and they must complete the minimum major and teaching courses, which is very low compared to the major teaching credits required by existing vocational high school teachers.

Meanwhile, vocational high schools have been promoting various systems related to the use of industrial-educational adjunct teachers in order to provide classes with field content using experts who have direct experience in field jobs. In 2018, the Ministry of Education presented the innovation direction and major requirements of vocational education and training, including secondary vocational education, in response to societal changes. The main tasks included those related to industrial-educational adjunct teachers. In addition to improving the treatment of industrial-educational adjunct teachers and improving the system to enable independent classes, a plan to grant teacher qualifications focused on new industries was proposed. In addition, a plan was proposed to introduce a special selection for incumbent teachers in specialized subjects so that excellent experts in the field could flow into vocational high schools. The model was not introduced or implemented.

As of July 2021, a total of 785 industrial-educational adjunct teachers were employed in 224 vocational high schools in Korea. They are mainly in charge of mechanical, electrical/electronic, information and communication subjects, and collectively have on average 15 years of experience in the industry. In addition, although most of them have certificates related to the subject they are in charge of, 652 people do not have the qualifications to teach the subject. Regarding classes, industrial-educational adjunct teachers are in charge of regular classes and after-school classes, and most of them do not evaluate students because they conduct cooperative classes rather than individual classes. With regard to employment and working methods, industrial-educational adjunct teachers are usually hired as contract workers, with most of them working part-time.

In particular, the recent paradigm of Korean education has shifted away from competition-oriented education and allows students to select a curriculum and take responsibility accordingly, motivating learning and promoting self-directed growth. The credit system was introduced as an effort to change and provide flexible and individualized education through diversification of curriculum operation. The credit system is a curriculum completion and operation system in which students select and complete various subjects according to their career path, and when the accumulated credits reach the standard, graduation is recognized (Ministry of Education in Korea, 2017). The Ministry of Education in Korea (2021) proposed again to support the acquisition of teacher qualifications through the 'Teacher Training Special Course' for industrial-educational adjunct teachers in new industries that do not have labelled subjects following the full introduction of the vocational high school credit system. To this end, the necessity of preparing a system to revise related laws was also suggested. However, at present, no concrete plan has been proposed, and further discussion is required on the future direction. At the national level, efforts are being made to resolve

the low field professionalism of vocational high school teachers and the rigidity of the teacher training process and marked subjects by using industrial-educational adjunct teachers. However, the most important factor will be the ability to consider the current situation of industrial-educational adjunct teachers. Therefore, it will be important to know the actual situation at the school sites where industrial-educational adjunct teachers are being used.

## Research Methods

### Sample for study

The purpose of this study was to investigate the differing recognitions of the use of external industry sector experts among school administrators and teachers working in vocational high schools in Korea. Principals and teachers working in schools were set as the survey population representing the vocational high school. As of 2020, a total of 506 vocational high schools in Korea are in operation. Exactly 461 specialized high schools and 45 Meister high schools are distributed at a ratio of 9:1, in provincial and metropolitan cities at about 6:4 (Ministry of Education in Korea, 2020). The sample were teachers who could represent the opinions of each school, and the sampling was made for 1,021 samples, 1 school administrator and 1 affiliated teacher, for a total of 2 per school.

### Instruments

Questionnaires was used as a survey tool for data collection. The questionnaire comprised a review of previous studies related to the use of industry sector experts in vocational high schools as industrial-educational adjunct teachers (Kim & Cha, 2001; Kim, 2018; Kim et al., 2016; Kim et al., 2001; Jang et al., 2014; Choi et al., 2008). Based on the results, a process of draft development, expert review, and revision was undertaken. As a result, the questionnaire was finally composed of a total of 15 items as shown in Table 1 on the current status and recognition of industrial-educational adjunct teachers, methods to grant teacher qualifications, and plans to expand the participation of industry sector experts in vocational high schools.

**Table 1** Composition of questionnaires

Category	Item
Status and recognitions on the utilization of industrial-educational adjunct teachers	Necessity of using industrial-educational adjunct teachers in vocational high schools
	Industries and job fields that require the use of industrial-educational adjunct teachers
	Teaching and learning methods and contents that require the use of industrial-educational adjunct teachers
	Main role of industrial-educational adjunct teachers
	Problems in the use of industrial-educational adjunct teachers
Measures for granting qualifications for industrial-educational adjunct teachers	Necessity for issuing qualifications for industrial-educational adjunct teachers
	Issuance of Teacher Qualifications for industrial-educational adjunct teachers
	Special course operation plan for issuance of qualifications for industrial-educational adjunct teachers
Measures for expanding the participation of industry sector experts in vocational high schools	Separate qualification issuance plan
	Measures to improve the teacher training and selection system
Demographic characteristics	Position, school type, industry sector, location

## Data collection and analysis

Data collection was conducted for about two weeks from September 13 to September 24, 2021 through an online survey system. In consideration of the possible survey recovery rate, non-response and insincere responses, school administrators and representative teachers from 506 vocational schools were encouraged to participate in the survey. Of the 1,021 distributed questionnaires, 440 were recovered and used for analysis. The general characteristics of vocational high school administrators and teachers who finally responded are shown in Table 2.

**Table 2** General Characteristics of Respondents

Category		n	%
Position	Teacher	16	3.64
	Head Teacher	257	58.41
	Vice Principal	134	30.45
	Principal	33	7.50
Type of School	Specialized high school	372	84.55
	Meister high school	54	12.27
	Others	14	3.18
Industry Sector of School	Industry	213	48.41
	Agriculture	36	8.18
	Commerce	137	31.14
	Fisheries and Oceans	13	2.95
	Others	41	9.32
Location of School	Province	265	60.22
	Metropolitan and special cities	175	39.78
	No	197	44.77
Total		440	100.00

The distribution of respondents shows that 327 students (84.55%) are in specialized high schools and 54 students (12.27%) in Meister high schools. In terms of school location, 265 students (60.21%) live in provinces and 175 (39.785) in metropolitan and special cities. The sample was similar to the school type and location distribution ratio of vocational high schools in Korea, which is the subject of the study. Respondents comprised 167 (37.95%) of principals and vice-principal managers and 273 (62.05%) teachers such as general teachers.

Data analysis was performed using the SPSS 23.0 for Windows program, and basic statistical values of frequency, ratio, mean and standard deviation were analyzed and difference verification (t-test) was performed as the main analysis methods. For all analyses, the statistical significance level ( $\alpha$ -level) was set to 5%.

## Results and Discussion

### Recognition of the utilization and problems for industrial-educational adjunct teachers

The recognition of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea

The t-test result showed that there was no significant difference between the use of industrial-educational adjunct teachers and the recognition of problems. The results of Table 3 confirm that there is no difference between the teacher group and the school administrator group in the recognition of the need for industrial-educational adjunct teachers in vocational high schools. Teachers and school administrators both evaluated the overall need for industrial-educational adjunct teachers highly with an average of 4.07 and 4.19.

**Table 3** Results of analysis the recognition of the necessity for industrial-educational adjunct teachers

Item	Group	n	M	S.D.	df	t	P-value																																																																																																																																	
Necessity of industrial-educational adjunct teachers	Teacher	273	4.07	.970	361.246	1.263	.207																																																																																																																																	
	Principal	167	4.19	.925				Machines	Teacher	273	4.29	.845	364.033	1.053	.293	Principal	167	4.20	.798	Electricity and Electronics	Teacher	273	4.34	.788	368.996	.645	.519	Principal	167	4.29	.731	Information and Communications	Teacher	273	4.36	.778	368.188	.084	.933	Principal	167	4.36	.723	Construction	Teacher	273	4.14	.907	377.404	1.043	.298	Principal	167	4.05	.815	Food Services	Teacher	273	4.16	.857	336.466	.442	.659	Principal	167	4.13	.896	Management, accounting, office work	Teacher	273	3.95	1.037	382.795	.579	.563	Principal	167	3.90	.912	Culture, art, design, broadcasting	Teacher	273	4.27	.826	345.685	.250	.803	Principal	167	4.25	.834	Agriculture, forestry and fishing	Teacher	273	4.07	.939	359.689	1.040	.299	Principal	167	3.98	.901	Teaching, learning methods, and contents that require industrial-educational adjunct teachers	Practical exercise classes	Teacher	273	4.44	.731	978.923	.410	.682	Principal	167	4.42	.653	Lectures on theory	Teacher	273	3.50	1.118	359.114	.543	.587	Principal	167	3.44	1.076	A program to share field experience	Teacher	273	4.63	.528	329.045	1.547	.123
Machines	Teacher	273	4.29	.845	364.033	1.053	.293																																																																																																																																	
	Principal	167	4.20	.798				Electricity and Electronics	Teacher	273	4.34	.788	368.996	.645	.519	Principal	167	4.29	.731	Information and Communications	Teacher	273	4.36	.778	368.188	.084	.933	Principal	167	4.36	.723	Construction	Teacher	273	4.14	.907	377.404	1.043	.298	Principal	167	4.05	.815	Food Services	Teacher	273	4.16	.857	336.466	.442	.659	Principal	167	4.13	.896	Management, accounting, office work	Teacher	273	3.95	1.037	382.795	.579	.563	Principal	167	3.90	.912	Culture, art, design, broadcasting	Teacher	273	4.27	.826	345.685	.250	.803	Principal	167	4.25	.834	Agriculture, forestry and fishing	Teacher	273	4.07	.939	359.689	1.040	.299	Principal	167	3.98	.901	Teaching, learning methods, and contents that require industrial-educational adjunct teachers	Practical exercise classes	Teacher	273	4.44	.731	978.923	.410	.682	Principal	167	4.42	.653	Lectures on theory	Teacher	273	3.50	1.118	359.114	.543	.587	Principal	167	3.44	1.076	A program to share field experience	Teacher	273	4.63	.528	329.045	1.547	.123	Principal	167	4.54	.568								
Electricity and Electronics	Teacher	273	4.34	.788	368.996	.645	.519																																																																																																																																	
	Principal	167	4.29	.731				Information and Communications	Teacher	273	4.36	.778	368.188	.084	.933	Principal	167	4.36	.723	Construction	Teacher	273	4.14	.907	377.404	1.043	.298	Principal	167	4.05	.815	Food Services	Teacher	273	4.16	.857	336.466	.442	.659	Principal	167	4.13	.896	Management, accounting, office work	Teacher	273	3.95	1.037	382.795	.579	.563	Principal	167	3.90	.912	Culture, art, design, broadcasting	Teacher	273	4.27	.826	345.685	.250	.803	Principal	167	4.25	.834	Agriculture, forestry and fishing	Teacher	273	4.07	.939	359.689	1.040	.299	Principal	167	3.98	.901	Teaching, learning methods, and contents that require industrial-educational adjunct teachers	Practical exercise classes	Teacher	273	4.44	.731	978.923	.410	.682	Principal	167	4.42	.653	Lectures on theory	Teacher	273	3.50	1.118	359.114	.543	.587	Principal	167	3.44	1.076	A program to share field experience	Teacher	273	4.63	.528	329.045	1.547	.123	Principal	167	4.54	.568																				
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	Principal	167	3.98	.901				Teaching, learning methods, and contents that require industrial-educational adjunct teachers	Practical exercise classes	Teacher	273	4.44	.731	978.923	.410	.682	Principal	167	4.42	.653	Lectures on theory	Teacher	273	3.50	1.118	359.114	.543	.587	Principal	167	3.44	1.076	A program to share field experience	Teacher	273	4.63	.528	329.045	1.547	.123	Principal	167	4.54	.568																																																																																												
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	Principal	167	4.54	.568																																																																																																																																				

Specifically, it was analyzed that the recognitions of the teacher group and the school manager group did not show a significant difference even in industries and job fields that require industrial-educational adjunct teachers. When comparing the average recognitions of industry and job fields, both groups scored an average of 4.3, indicating that information and communication fields require the most industrial-educational adjunct teachers. Differently, electrical/electronic fields (teacher group: 4.34, school administrator group: 4.29), culture, art, design, broadcasting field (teacher group: 4.27, school administrator group: 4.25), mechanical field (teacher

The recognition of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea

group: 4.29. school administrators) Group: 4.20), food service sector (teacher group: 4.16, school administrator group: 4.13), and construction sector (teacher group: 4.14, school administrator group: 4.04), in that order, both groups had the same results in terms of manifested rank. In both groups, the fields with the least need were business administration, accounting, and office work (teacher group: 3.95, school administrator group: 3.90).

According to the teaching and learning method and content, both school administrators and teachers recognized that an industry sector teacher was necessary when operating the field experience sharing program (teacher group: 4.63, manager group: 4.54), and recognized that their necessary for practical classes (teacher group: 4.44, manager group: 4.42). Relatively, theoretical lectures showed a low need for industrial-educational adjunct teachers (teacher group: 3.50, manager group: 3.44).

**Table 4** Results of analysis on the recognition for use and problems of industrial-educational adjunct teachers

Item	Group	n	M	S.D.	df	t	p-value																																																																				
Lack of Teacher's competency/ability	Teacher	273	2.79	1.294	358.956	1.536	.125																																																																				
	Principal	167	2.60	1.245				Decreased utilization due to the impossibility of private lessons	Teacher	273	3.24	1.393	356.828	1.815	.070*	Principal	167	2.99	1.351	Lack of difference between normal teachers	Teacher	273	2.88	1.297	355.188	.926	.355	Principal	167	2.76	1.266	Lack of recognition and interest in the policy related to the industry sector experts	Teacher	273	3.29	1.240	333.730	2.338	.020**	Principal	167	2.99	1.310	Low wages	Teacher	273	3.89	1.078	364.280	.041	.968	Principal	167	3.89	1.017	Low access to schools	Teacher	273	4.02	1.071	324.461	1.349	.178	Principal	167	3.87	1.173	Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928
Decreased utilization due to the impossibility of private lessons	Teacher	273	3.24	1.393	356.828	1.815	.070*																																																																				
	Principal	167	2.99	1.351				Lack of difference between normal teachers	Teacher	273	2.88	1.297	355.188	.926	.355	Principal	167	2.76	1.266	Lack of recognition and interest in the policy related to the industry sector experts	Teacher	273	3.29	1.240	333.730	2.338	.020**	Principal	167	2.99	1.310	Low wages	Teacher	273	3.89	1.078	364.280	.041	.968	Principal	167	3.89	1.017	Low access to schools	Teacher	273	4.02	1.071	324.461	1.349	.178	Principal	167	3.87	1.173	Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928	Principal	167	3.63	1.218								
Lack of difference between normal teachers	Teacher	273	2.88	1.297	355.188	.926	.355																																																																				
	Principal	167	2.76	1.266				Lack of recognition and interest in the policy related to the industry sector experts	Teacher	273	3.29	1.240	333.730	2.338	.020**	Principal	167	2.99	1.310	Low wages	Teacher	273	3.89	1.078	364.280	.041	.968	Principal	167	3.89	1.017	Low access to schools	Teacher	273	4.02	1.071	324.461	1.349	.178	Principal	167	3.87	1.173	Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928	Principal	167	3.63	1.218																				
Lack of recognition and interest in the policy related to the industry sector experts	Teacher	273	3.29	1.240	333.730	2.338	.020**																																																																				
	Principal	167	2.99	1.310				Low wages	Teacher	273	3.89	1.078	364.280	.041	.968	Principal	167	3.89	1.017	Low access to schools	Teacher	273	4.02	1.071	324.461	1.349	.178	Principal	167	3.87	1.173	Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928	Principal	167	3.63	1.218																																
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	Principal	167	3.87	1.173				Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928	Principal	167	3.63	1.218																																																								
Problems related to contract	Teacher	273	3.64	1.238	352.967	.090	.928																																																																				
	Principal	167	3.63	1.218																																																																							

\*\*p<.05, \*p<.10

Table 4 is the t-test result on the difference in recognition of problems when using industrial-educational adjunct teachers. There was a statistical difference between the teacher group and the manager group in terms of the recognition that utilization is lowered due to the inability to teach alone ( $p < 0.10$ ). In other words, the teacher group was relatively higher than the school administrator group in the recognition that

problems occurred because the industrial-educational adjunct teachers were unable to conduct classes alone. In addition, there was also a difference between the teacher and manager groups in their recognition of the problem that industry field experts did not know the system of industry sector teacher well and that they could not use this system properly because they had relatively little interest ( $p < 0.05$ ). Teachers perceived the lack of interest from industry sector experts as a bigger problem than managers.

There was also a difference in the level of problem recognition between the teacher group and the manager group in terms of ranking. In the case of teachers, the biggest problem (average 4.02) was that it was difficult to secure manpower when the school was located outside the city (lack of industry sector experts according to local conditions such as township units). In the case of the school administrator group, the biggest problem (average

3.89) was the lack of budget to provide for industrial-educational adjunct teachers and the decrease in utilization due to low hourly wages (difficulty in hiring due to low hourly wages).

### **Recognition of the plan for granting qualifications for industrial-educational adjunct teachers and the operation of special courses**

Table 5 is the t-test result on the difference in recognitions on whether and specifically what qualifications should be granted to industrial-educational adjunct teachers.

**Table 5** Results of analysis on recognition of industrial-educational adjunct teachers for teaching qualifications

The recognition of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea

[BACK](#)

Item	Group	n	M	S.D.	df	t	p-value																																
The necessity of issuing teaching qualifications for industrial-educational adjunct teachers	Teacher	273	2.43	1.310	338.045	1.270	.205																																
	Principal	167	2.60	1.362				Grant of qualifications for existing marked subjects ※ Machinery, metal, electricity, electronics, etc.	Teacher	273	2.79	1.350	358.238	1.449	.148	principal	167	2.98	1.302	Measure of issuing qualifications for industrial-educational adjunct teachers	Teacher	273	3.20	1.272	368.454	3.198	.002**	principal	167	3.58	1.181	New industry-labeled subject qualifications and detailed major fields marked ※ New industry (drone), new industry (artificial intelligence), etc.	Teacher	273	3.42	1.219	360.048	2.353	.019**
Grant of qualifications for existing marked subjects ※ Machinery, metal, electricity, electronics, etc.	Teacher	273	2.79	1.350	358.238	1.449	.148																																
	principal	167	2.98	1.302				Measure of issuing qualifications for industrial-educational adjunct teachers	Teacher	273	3.20	1.272	368.454	3.198	.002**	principal	167	3.58	1.181	New industry-labeled subject qualifications and detailed major fields marked ※ New industry (drone), new industry (artificial intelligence), etc.	Teacher	273	3.42	1.219	360.048	2.353	.019**	principal	167	3.69	1.169								
Measure of issuing qualifications for industrial-educational adjunct teachers	Teacher	273	3.20	1.272	368.454	3.198	.002**																																
	principal	167	3.58	1.181				New industry-labeled subject qualifications and detailed major fields marked ※ New industry (drone), new industry (artificial intelligence), etc.	Teacher	273	3.42	1.219	360.048	2.353	.019**	principal	167	3.69	1.169																				
New industry-labeled subject qualifications and detailed major fields marked ※ New industry (drone), new industry (artificial intelligence), etc.	Teacher	273	3.42	1.219	360.048	2.353	.019**																																
	principal	167	3.69	1.169																																			

\*\*p<.05

The necessity for issuance of teacher qualifications for industrial-educational adjunct teachers was found to be relatively low in both groups, and there was no statistically significant difference (teacher group: 2.43, school administrator group: 2.60). Most of the current teachers and managers are those who have been issued teacher qualifications through the long-term teacher training system such as the existing college of education and teaching courses, and this result can be seen in terms of equity and differentiation.

On the other hand, it was analyzed that there was an average difference between the groups in the recognition of which qualification would be issued if a teacher qualification was issued to an industry sector teacher ( $p < 0.05$ ). Regarding the method of granting the same qualifications as the current marked subject assignment method, but additionally specifying the details of the specific major field, the school administrator group recognized that it was a more suitable method than the teacher group (teacher group: 3.20, school administrator group: 3.58). The method of creating a new qualification for a new labeled subject called 'new industry' and marking detailed major fields together was also recognized as a more suitable method for the school administrator group than the teacher group (teacher group: 3.42, school administrator group: 3.69). On the other hand, when comparing the average size of each group's recognition on the issuance of teacher qualifications for industrial-

educational adjunct teachers, both groups considered the most appropriate method to mark detailed major fields after newly establishing new industry-labeled subject qualifications (teacher group: 3.42, school administrator group: 3.69). It was the least preferred to grant qualifications for existing marked subjects (teacher group: 2.79, school administrator group: 2.98).

Table 6 shows differences in recognitions about the specific time, method, and composition of the curriculum when operating a special course for the issuance of teacher qualifications. The teacher and manager groups recognized that the vacation intensive system was the most appropriate time, and there was no significant difference between the operation through offline education and the recognition of the blended (online + offline) method. In the case of curriculum composition, teachers and administrators had similar recognitions. They answered that 'teaching profession theory, teaching knowledge, educational practice, and major content course completion,' which contains the most content, was the most appropriate composition, and was similar to the minor training course that existing teachers must complete when acquiring a minor. It was recognized that the process had to be implemented.

**Table 6** Results of analysis of recognition on the special curriculum operation plan for the granting of teacher qualifications for industrial-educational adjunct teachers

	Item	Group	n	%	Total	Chi <sup>2</sup>
Operation Period (Multiple answers were permitted)	Intensive vacation system (seasonal system)	Teacher	192	70.33	5 6 2	0.128
		Principal	132	79.04		
	weekend system	Teacher	79	28.94		
		Principal	46	27.54		
	night system	Teacher	79	28.94		
		Principal	34	20.36		
Operation Methods (multiple answers were permitted)	Group training (offline)	Teacher	165	60.44	4 6 7	0.335
		Principal	90	53.89		
	Blended (group training + online)	Teacher	123	45.05		
		Principal	89	53.29		
Composition of Educational Course	Upon completion of teaching profession theory and teaching literacy courses (18 credits) Issuance of teacher qualification certificate	Teacher	23	8.42	4 0 5	0.858
		Principal	13	7.78		
	Upon completion of teaching profession theory, teaching knowledge, and educational practice courses (22 credits), issuance of teacher qualifications (credits for teaching profession-related subjects excluding major subjects)	Teacher	33	12.09		
		Principal	21	12.57		
		Teacher	192	70.33		
		principal	123	73.65		

### Recognition of ways to expand the participation of industry sector experts

Table 7 presents the result of analyzing the differences in the recognitions of specific measures to enable industry field experts to participate more actively in addition to the consideration of the industry sector teacher system.

**Table 7** Results of analysis of recognition on ways to expand the participation of experts in the industrial field

Item	Group	n	M	S. D.	df	t	p-value																																																								
Issuance of temporary teacher qualifications (classes are available only for a certain period of time, then renewed if necessary)	Teacher	273	3.12	1.318	338.463	.206	.837																																																								
	principal	167	3.14	1.367				Improvement and issuance of the existing para-teacher qualification system	Teacher	273	2.96	1.277	347.112	.062	.951	principal	167	2.96	1.283	Establishment and issuance of separate qualifications for independent classes	Teacher	273	3.03	1.347	339.150	.083	.934	principal	167	3.02	1.395	Establishment of special selection for incumbents at the College of Education for nurturing vocational teachers	Teacher	273	3.46	1.185	338.459	.423	.672	principal	167	3.51	1.230	Establishment of special recruitment for teachers for industry field experts	Teacher	273	2.94	1.312	345.763	1.175	.241	principal	167	3.09	1.325	Additional points are given for field expertise such as industry experience and related qualifications during the secondary school teacher recruitment test (appointment test)	Teacher	273	3.38	1.234	350.257	1.731	.084*
Improvement and issuance of the existing para-teacher qualification system	Teacher	273	2.96	1.277	347.112	.062	.951																																																								
	principal	167	2.96	1.283				Establishment and issuance of separate qualifications for independent classes	Teacher	273	3.03	1.347	339.150	.083	.934	principal	167	3.02	1.395	Establishment of special selection for incumbents at the College of Education for nurturing vocational teachers	Teacher	273	3.46	1.185	338.459	.423	.672	principal	167	3.51	1.230	Establishment of special recruitment for teachers for industry field experts	Teacher	273	2.94	1.312	345.763	1.175	.241	principal	167	3.09	1.325	Additional points are given for field expertise such as industry experience and related qualifications during the secondary school teacher recruitment test (appointment test)	Teacher	273	3.38	1.234	350.257	1.731	.084*	principal	167	3.59	1.226								
Establishment and issuance of separate qualifications for independent classes	Teacher	273	3.03	1.347	339.150	.083	.934																																																								
	principal	167	3.02	1.395				Establishment of special selection for incumbents at the College of Education for nurturing vocational teachers	Teacher	273	3.46	1.185	338.459	.423	.672	principal	167	3.51	1.230	Establishment of special recruitment for teachers for industry field experts	Teacher	273	2.94	1.312	345.763	1.175	.241	principal	167	3.09	1.325	Additional points are given for field expertise such as industry experience and related qualifications during the secondary school teacher recruitment test (appointment test)	Teacher	273	3.38	1.234	350.257	1.731	.084*	principal	167	3.59	1.226																				
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	principal	167	3.59	1.226																																																											

\*p<.10

In the case of the teacher group, as a specific way to expand the participation of industry sector experts, it was recognized that the most appropriate method was to set up a special selection for incumbent teachers at the College of Education for nurturing professional teachers (average score of 3.46). After that, it was recognized that the method of ‘granting additional points for field expertise during the appointment test’ was appropriate (average of

3.38 points), and the method of temporarily issuing teacher qualifications followed with an average of 3.12 points. The method that was recognized as unsuitable was the method of ‘establishing special recruitment of teachers for industrial field experts’ (average of 2.94). In the case of the manager group, similar to the teacher group, when taking the appointment test, the method of giving additional points for industry experience and related qualifications was considered the most appropriate with an

average of 3.59 points, and the method of establishing special selection for incumbents at the College of Education was on average 3.51. The existing ‘Improvement and Issuance of the Associate Teacher Qualification System’ was recognized as the most unsuitable method with an average score of 2.96. Above all, there was a difference in recognition between the manager group and the teacher group about the method of granting additional points for field expertise in the recruitment exam, which is a competitive exam for selecting secondary school teachers. That is, the manager group perceived that the method was more appropriate than the teacher group, and it was found that this was significant at the significance level of 0.10.

## **Conclusions and Implications**

The purpose of this study was to investigate the differing recognitions of principals and teachers working in vocational high schools in Korea regarding the use of external industry sector experts. The conclusions derived from the main research results and discussions are as follows.

First, it is necessary for both the school administrators and teachers working in vocational high schools to utilize the industry sector teacher system to enhance industrial field ability. It is necessary in all industrial fields such as machinery; it is recognized that the necessity is high especially in fields that require the sharing of field experience or practical guidance, rather than theoretical lectures.

Second, despite the high demand for industrial-educational adjunct teachers in vocational high schools, both teachers and managers recognize difficulties in securing manpower due to low school access and hiring difficulties because of low wages. In particular, teachers recognize the lack of interest and awareness of stakeholders about the current qualifications and related systems, which do not permit industrial-educational adjunct teachers to conduct classes independently. This is not recognized by the school administrators such as vice principals and principals.

Third, both teachers and managers have a low awareness of the necessity of issuing official teacher qualifications to the existing industrial-educational adjunct teachers in order to enhance the utilization of industry sector experts in vocational high schools for reasons such as equality with the current teacher training system. Nevertheless, if teacher qualifications are issued to them, the method of establishing a separate qualification in a new industry field or adding a detailed major field to the existing

qualification is considered to be moderately appropriate. In addition, when operating a special course for the issuance of teacher qualifications, to solve the issue of equity with the existing teacher qualification acquisition process, it is recommended that the course is operated in an intensive vacation system and offline format. In addition, students should be required to complete both teaching related subjects and major content subjects.

Fourth, considering the measures to expand the participation of industry sector experts in vocational high schools other than the industry sector system, both teachers and managers are moderately in agreement with the establishment of a special selection for incumbents to the teacher training institute targeting industry sector experts and the provision of additional points when selecting teachers. With regards to the method of allocating additional points when selecting teachers, it is recognized that the managers are more appropriate for this purpose than teachers.

Korea's system for the use of industry sector experts, such as the industry sector teacher system, is actively used in vocational high schools, and the vocational high school managers and teachers are aware of the need. It also appears that they are, to some extent, doing their part in the school field. However, the following suggestions are made to further enhance the utilization of industry sector experts, such as industrial-educational adjunct teachers, and increase the on-the-spotness of vocational high schools.

First, it may be difficult in reality to issue a full-time teacher qualification after having an industrial-educational adjunct teacher complete a certain curriculum due to backlash from the school site. However, as the current law allows the operation of a special teacher training course, it is necessary to promote the related system.

Second, in order to minimize discrimination and dissatisfaction with teachers who have been trained through the Colleges of Education, teaching courses, and graduate schools of education, it is necessary to structure the curriculum so that students can complete teaching related subjects and major subjects corresponding to each marked subject. However, for efficient operation, it is necessary to consider a method for the accreditation of credits.

Third, it is necessary to prepare practical improvement plans by piloting a special teacher training course for some industrial-educational adjunct teachers and analyzing the differences with existing teachers who have completed the course.



Fourth, it is necessary to consider ways to utilize experts from various industries other than the industry sector teacher system. It is realistically possible to establish a special course to become a teacher for worker in the existing college of education and to give additional points to the recruitment test. In this regard, specific standards should be established

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The recognition of principals and teachers on the utilization of industry sector experts in vocational high schools in Korea

**BACK**

# **Is vocational education still a second choice? ——Differences in the background between secondary vocational and academic high school students in China**

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## **Abstract**

Worldwide, vocational education has been seen as a second choice for lower achievement students. This phenomenon is also in China, the data from the government shown the enrollment of vocational education began to decline since 2010. However, technical development needs vocational training to train young skilled. Therefore, it is very important to clearly understand what background factors are mainly related to children's educational choices. Did the poor children choose vocational education (ascribed factors)? Or did the disadvantaged child choose vocational education (achieved factors)?

In this study, data from China Family Panel Survey (CFPS) dataset in 2010-2018. The results have shown that mathematical ability is the most important factor, which is a significant negative associated with vocational educational choice, even worse after 2014. The family background difference is narrowing, which is not significant compare with personal ability. The screening policy of the education system should not be based on grades as the most important basis. The family backgrounds of children in different education systems are smaller, and the public's prejudice against vocational education needs to be changed.

**Keywords:** Education choice; Vocational education; Ascribed factors; Achieved factors

## 1. Introduction

Until 2030, our education should be equal, sustainable, and affordable. The skilled employee is needed to help sustainable development (Sustainable Development Goal 4). Vocational education is crucial for our technology and intelligent era, especially towards employability and shortages of skill (Lerman, 2013; Montague et al., 2017; Newton et al., 2005). However, vocational education and training (VET) do not popular as before, and with it, VET cannot meet the demand of the labor market, the evidence be found in Australia, United States, and Southern European countries (Billett, S, etc, 2020; Zenner-Höffkes et al., 2021; Iannelli and Raffe, 2007).

One of the reasons is the new generation who choose vocational education has been stigmatized in recruiting programs, public opinion, and even in the education system (Frohne, 2019; Hopkins 2011; Woolf et al. 2008). However, as an inseparable part of the future, VET training a lot of high-level skills, building apprenticeships with many companies. It deserves respect, retaining, and development (Wolf, A., 2011). On the other side, VET is positively developing in France, Switzerland, and Denmark (Iannelli and Raffe, 2007; Jesper Rozer, etc, 2020), they think VET is a connection with socio-economic, VET can provide a good chance for the young generation (Powell and Solga, 2011).

The importance of VET is recognized by China government, the Central Committee of the Communist Party of China published policies in 2010, to promote VET development. However, the enrollment of secondary vocational education is decreasing (results from the Ministry of Education of the PR of China). In Shoubin, W (2015) study, more than 80% of people thought the VET is a second choice, an “inferior” choice, public opinion affects the choice of the young generation. Valentina Di Stasio (2017) proved when it comes to the expansion of higher education, more and more people choose of avoiding vocational education. And with the human capital theory, search and match theory, and assignment theory (Hartog, 2000), people are more inclined to choose higher education, and overeducation has become a controversial topic. The fact is that many graduates with overeducated are not able to get the expected high private rate of return to a degree (Dolton, P., & Vignoles, A, 2000, Voon & Miller, 2005). The public needs an accurate image of VET, to promote the children choose a suitable road, rather than a good road. In this situation, the aim of this research is to try to find out the difference of background between secondary vocational education and academic high education, are the young generation who choose VET is “disadvantaged kids”? What is the difference? How to develop over time?

## **2. Theoretical background**

Sewell, Haller, etc., (1970) mentioned a social-psychological model of educational choice, and Hauser (1972) developed Wisconsin status attainment model. Those models used educated personal factors (achieved factors: high school grades, mental choice), and family factors (ascribed factors: parents' education level, parents' job, income of family) to research the relationship with students' educational choice.

For achieved factors, quantitative research has shown the advantage students would like to choose academic school instead of VET school (Hansen and Woronov 2013). Higher academic performance, higher possibility of participating in academic school (Zhou, H..., 2021; ). For ascribed factors, Dufur, Parcel, & Troutman (2013); Parcel & Dufur (2001); Sewell et al., (2003) point that parental resources have a more powerful effect on adolescents' academic achievement than school resources. Family size can predictor education choice (Andrew & Hauser, 2011; Sewell et al., 2003). Dufur, Parcel, & Troutman (2013) also proved the connection between ascribed factors and achieved factors, ascribed factors are more significant effect on the children's academic achievement compared with school factors.

More than that, based on the society of China, region (Yi, H., et. al., 2015; Qian & Smyth, 2008) and Hukou (Youqin, H, 2001; Liu, Z. 2005) also are important factors towards personal development.

By comparing the differences in income, job, and socioeconomic status, most researchers are researching the outcome difference between vocational education graduates and academic high education graduates (Di Stasio, V., 2017; Moenjok, T., & Worswick, C., 2003). Or during high school the differences in gender and ethnicity (Bunce, L., King, N...,2021; Cotton, D. R., Joyner, M..., 2016; Kaba, A. J., 2005). However, at the starting point of education, the background differences between those two groups in high school are ignored, especially at the secondary high school level.

## **3. Methodology**

### *3.1. Dataset and variables*

2010 by Peking University, collecting Chinese communities, families, and individuals' longitudinal data every two years (2010, 2012, 2014, 2016, and 2018). The data were collected by computer-assisted personal interviewing (CAPI) technology which was guided by the university of Michigan.

For the aim of the study, we restricted the interviewees between 15 and 19 years old, and different samples in those five years datasets, to make sure the data was collected during their high school year. Finally, the number of samples is 1151. Considering some respondents did not answer some questions, especially mother's job, we used the multiply imputed data by SPSS 27.0.

High education type of teenager students as the dependent variable, academic high education group is "0", vocational high education group is "1". Region (according to geographic area, east is "1", middle is "2", and west is "3"), gender (female is "1", male is "0"), and Hukou (household registration in rural is "1", household registration in urban is "0") as anthropological variables. Word ability, mathematic ability, satisfaction of life, and friendship as achieved factors, medium and above is "1", below is "0". Family size, investment of education, income of family, parents' education level, and parents' job as ascribed factor, medium and above is "1", below is "0".

### 3.2. Analysis

Using 5 years of data, the 6 logistic regressions consisted (separately in 2010, 2012, 2014, 2016, 2018, and overall). In addition to reporting the odds ratios and beta values for each term, the two pseudo- R<sup>2</sup> indices Cox and Snell's R<sup>2</sup> are included (Field A, 2001).

## 4. Results

Descriptive statistics for the sample are provided in Figure 1, shown that most samples are choice academic high school (Mean=.312), only 31.1% of teenagers choose VET. Around half of sample is from east of China (Mean=1.781), and more with rural Hukou. Compared with ascribed factors, achieved factors are better. The overall sample of mathematic ability is lower (Mean=.472). Father's social status is higher than the mother's generally, the average levels of achieved factors

and ascribed factors were 3.368 and 2.592, respectively. Male and female are roughly balanced (Mean=0.517).

Figure 1: Descriptive statistics on different high school education groups (n=1151)

Variables	n	Min	Max	Mean	SD
Year	1151	2010	2018	2014.231	3.124
High Education Type	1151	0	1	.312	.463
Region	1151	1	3	1.781	.777
Gender	1151	0	1	.517	.500
Hukou	1151	0	1	.676	.468
Word ability	1151	0	1	.631	.483
Mathmatic ability	1151	0	1	.472	.499
Satisfaction of life	1151	0	1	.657	.475
Friendship	1151	0	1	.736	.441
achieved_class	1151	1	5	3.368	1.120
Familysize	1151	1	14	4.251	1.456
Investment of education	1047	0	1	.487	.500
Income of family	1099	0	1	.244	.430
Father's education	1118	0	1	.247	.431
Mother's education	1130	0	1	.189	.392
Father's job	964	0	1	.125	.330
Mother's job	910	0	1	.121	.326
ascribed_class	1055	1	5	2.592	.947
Valid N (listwise)	727				

Source: CFPS

And the results of the logistic regression are provided in Figure 2A-B. First of all, consistent with prior research, academic ability was significantly positively related to high education type. Through 8 years, compared with word ability (only in 2010  $P=.001$ , and 2018  $P=.039$ ), mathematic ability has always had a significantly negative relationship with educational choices ( $\beta = -1.012 \sim -3.761$ ,  $P < .001$ ). In other words, teenagers who had higher mathematic ability were significantly likely to choose academic high school.

As shown in Figure 2A-B, the full models accounted for between 35.5%-74.7% of the variance in the likelihood of choosing academic high school or vocational high school in 2010, 29.1%-39% in 2012, 39.5%-52.7% in 2014, 15.2%-22.1% in 2016, 25.6%-38.5% in 2018, and 24.8%-35% in all 8 years. According to Cohen (1992)  $R^2$  value .12 or below indicate low, between .13 to .25 values indicate medium, .26 or above, and above values indicate high effect size in social science.

In 2010 (Figure 2A), personal friendship is positively related to VET choice ( $\beta = 1.867$ ,  $P = .000$ ), and east of China significantly positively related to VET ( $\beta = 1.353$ ,  $P = .027$ ). The family background did not have a significant association with education choice, eg. investment of education ( $\beta = -.190$ ,  $P = .827$ ); father's education ( $\beta = -.715$ ,  $P = .489$ ). However, the data in 2012, was significant with such

trends, investment of education (beta=-1.037, P=.013); father's education (beta=-1.369, P=.043). In terms of change in odds ratios, a one standard deviation increase in investment of education or father's education was a .355 decrease or a .254 decrease in the odds of chose VET. And in 2012, rural Hukou did significantly chose VET (beta=1.250, P=.012), conversely, more people living in the household less the possibility of teenagers choose VET (beta=-.500, P=.002).

The data in 2014 shown the attitude towards life significantly related to education choice, the higher satisfaction of life the less possibility of teenagers choose VET (beta=-.500, P=.002). However, this situation is not constant. In 2010-2012, the relationship between satisfaction of life and education choice was positive, and then negative in 2014, from 2016-2018, it turned into a positive relationship. Only in 2014, the data shows that mothers have a relationship with teenagers' educational choices. On the whole, the relationship between the mother's and teenagers' high school choices is not indicating, from 2010 to 2018, the mother's education, mother's job, and father's job not significantly related with high education type.

The relationship between the family economic factors and high school choice was different, investment in education had a significantly negative relationship with the dependent variable (beta=-1.307, P=.013 in 2012; beta=-.359, P=.035 in overall). Income of family did have a positive but not significant association with high school choice. And compared with 2018, the sample from 2010-2016 had more likelihood to choose VET, especially in 2012 (beta=1.215, P=.000) and 2014 (beta=1.643, P=.000).

Meanwhile, from the perspective of the density of the distribution of different groups, the distribution within the AE group ranges from sparse to dense finally; while the VET group is developing in the opposite direction.

Is vocational education still a second choice? — Differences in the background between secondary vocational and academic high school students in China

Figure 2A: The influence of Achieved Factors and Ascribed Factors on high school education choice (2010-2014s)

	education choice in 2010			education choice in 2012			education choice in 2014		
	B(SE)	Exp (beta)	P	B(SE)	Exp (beta)	P	B(SE)	Exp (beta)	P
Region(EAST)	1.353 (0.612)	3.871	0.027*	0.164 (0.488)	1.178	0.737	1.239 (0.664)	3.453	0.062
Region(MIDDLE)	0.065 (0.679)	1.067	0.924	-0.876 (0.528)	0.416	0.097	0.687 (0.630)	1.988	0.276
Gender	-0.037 (0.402)	0.964	0.927	-0.143 (0.367)	0.867	0.698	0.479 (0.512)	1.615	0.349
Hukou	0.137 (0.489)	1.147	0.779	1.250 (0.495)	3.489	0.012*	0.761 (0.638)	2.140	0.233
Word ability	-1.408 (0.432)	0.245	0.001**	-0.615 (0.400)	0.541	0.125	-0.732 (0.655)	0.481	0.264
Mathmatic ability	-1.896 (0.487)	0.15	0.000***	-1.012 (0.371)	0.364	0.006***	-1.723 (0.537)	0.179	0.001**
Satisfaction of life	0.751 (0.436)	2.119	0.085	-0.892 (0.381)	0.41	0.019*	-2.022 (0.718)	0.132	0.005***
Friendship	1.867 (0.449)	6.469	0.000***	0.204 (0.444)	1.227	0.645	1.354 (0.895)	3.872	0.13
Familysize	-0.023 (0.169)	0.978	0.893	-0.500 (0.162)	0.606	0.002**	-0.124 (0.149)	0.884	0.407
Investment of education	-0.190 (0.431)	0.827	0.66	-1.037 (0.419)	0.355	0.013*	-0.170 (0.581)	0.844	0.77
Income of family	0.453 (0.623)	1.573	0.467	0.516 (0.547)	1.676	0.346	0.374 (0.636)	1.453	0.557
Father's education	-0.715 (0.575)	0.489	0.213	-1.369 (0.674)	0.254	0.043*	0.288 (0.746)	1.334	0.7
Mother's education	0.173 (0.659)	1.189	0.793	0.160 (0.783)	1.174	0.838	-1.853 (1.038)	0.157	0.074
Father's job	0.028 (0.884)	1.028	0.975	-0.613 (1.366)	0.542	0.654	-0.024 (0.992)	0.976	0.98
Mother's job	-1.249 (1.039)	0.287	0.232	0.658 (1.184)	1.93	0.579	-2.314 (1.006)	0.099	0.022**
Constant	-1.614 (1.113)	0.199	0.147	2.950 (1.100)	19.106	0.007**	1.077 (1.263)	2.937	0.394
Cox & Snell R <sup>2</sup>	0.355			0.291			0.395		
Nagelkerke R <sup>2</sup>	0.547			0.390			0.527		

\*\*\*: significant at 0.1% level; \*\*: significant at 1% level; \*: significant at 5% level

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Figure 2B: The influence of Achieved Factors and Ascribed Factors on high school education choice (2016-2018s & overall)

	education choice in 2016			education choice in 2018			education choice in 8 years		
	B(SE)	Exp (beta)	P	B(SE)	Exp (beta)	P	B(SE)	Exp (beta)	P
Region(EAST)	0.247 (0.437)	1.280	0.573	0.072 (0.400)	1.074	0.857	0.523 (0.200)	1.687	0.009**
Region(MIDDLE)	0.384 (0.428)	1.467	0.37	-0.258 (0.409)	0.772	0.527	0.031 (0.207)	1.032	0.88
Gender	0.412 (0.333)	1.509	0.216	-0.161 (0.321)	0.851	0.616	0.112 (0.152)	1.119	0.46
Hukou	-0.089 (0.429)	0.915	0.835	0.471 (0.413)	1.601	0.255	0.397 (0.191)	1.487	0.038*
Word ability	-0.515 (0.354)	0.597	0.146	-0.668 (0.324)	0.513	0.039*	-0.841 (0.163)	0.431	0.000***
Mathmatic ability	-1.098 (0.332)	0.334	0.001**	-3.761 (1.031)	0.023	0.000***	-1.510 (0.169)	0.221	0.000***
Satisfaction of life	0.009 (0.354)	1.009	0.979	0.089 (0.341)	1.093	0.795	-0.300 (0.158)	0.741	0.058
Friendship	0.232 (0.658)	1.261	0.724	-1.034 (0.397)	0.356	0.009**	0.431 (0.197)	1.539	0.029*
Familysize	-0.079 (0.123)	0.924	0.523	-0.081 (0.106)	0.923	0.445	-0.117 (0.054)	0.889	0.030*
Investment of education	-0.255 (0.364)	0.775	0.484	0.126 (0.373)	1.134	0.736	-0.359 (0.169)	0.698	0.035*
Income of family	-0.667 (0.411)	0.513	0.105	-0.055 (0.365)	0.946	0.88	0.011 (0.193)	1.011	0.953
Father's education	-1.088 (0.537)	0.337	0.043*	-0.806 (0.469)	0.447	0.086	-0.782 (0.236)	0.457	0.001**
Mother's education	-0.176 (0.554)	0.839	0.751	-0.564 (0.496)	0.569	0.256	-0.320 (0.262)	0.726	0.221
Father's job	0.114 (0.683)	1.120	0.868	-0.471 (0.645)	0.624	0.466	-0.121 (0.332)	0.886	0.716
Mother's job	0.165 (0.624)	1.179	0.792	0.199 (0.543)	1.22	0.714	-0.457 (0.348)	0.633	0.192
Year (2010)							0.227 (0.238)	1.255	0.341
Year (2012)							1.215 (0.236)	3.370	0.000***
Year (2014)							1.643 (0.263)	5.172	0.000***
Year (2016)							0.409 (0.228)	1.505	0.073
Constant	0.085 (1.095)	1.088	0.938	0.818 (0.759)	2.265	0.282	-0.089 (0.421)	0.915	0.832
Cox & Snell R <sup>2</sup>	0.152			0.256			0.248		
Nagelkerke R <sup>2</sup>	0.221			0.385			0.350		

\*\*\*: significant at 0.1% level; \*\*: significant at 1% level; \*: significant at 5% level

## **5. Discussion and Conclusion**

Quantitative evidence shows that more and more students with lower achieved ability choose VET or the advantage students' preference for academic over vocational education (Hansen and Woronov 2013). This result proves mathematical ability is the key point to affect students' choice, Chinese people think the children's mathematical ability is associate with their future achievements.

The key factors are attitudes about different systems of education should change (Murphy, 2014). Friendship and satisfaction in life show that teenager's opinion will affect their choice. From this point, to achieve equitable, sustainable, and inclusive education for all (SDG4), greater care needs to guide public opinion to accurate and meaningful aspects. Researching people's opinions about VET should understanding whole society political sustainability of education (Hemerijck, 2013).

Students from the east of China's preference for VET, this result is also consistent with region economic, quality of vocational school, and government policy (Yi, H., Zhang, L. et. al., 2015). And the rural Hukou shows that students more likely to attend VET, it is considered that rural household has less investment of education which also significantly positively related with teenager's choice.

Education is lifelong and continuous, is a kind of great promotion to a person's development. Education should match a person's lasting development. Therefore the choice of system of education should not be simply judged and classified based on academic performance. (Shavit and Müller, 2000).

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# **Connotation, motivation and strategy of internationalization of Higher Vocational Education in China**

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## **Abstract**

As a type of higher education, the internationalization of higher vocational education is a special form of higher education internationalization. Facing the complex changes of the social economic environment and the demands of the connotative development of higher vocational education, the internationalization of higher vocational education in the new era has new connotations and missions. However, due to the unclear connotation of the concept, low development quality, incomplete guarantee mechanism and low level of attention, the internationalization of higher vocational education in China has always been at a shallow and low level, and it is difficult to contribute to the development of higher vocational education and national development. can. In the new transition period, the high-level development of the internationalization of higher vocational education needs to determine the development position of riding in the new era while clarifying its conceptual connotation and development motivation. On this basis, the study explores new strategies for the high-level international development of China's higher vocational education under the development positioning of the new era by combing through the experiences of international exchanges and cooperation in the 2019-2020 annual report on the quality of higher vocational colleges in China. The study found that the "transformation" in the internationalization of China's higher vocational education is a verb, which is a process of multi-element, multi-subject, multi-form cooperation and communication, divided into three levels: concept, organization and activity; due to superficial factors—— The actual needs of national interests and deep-seated factors——community and the awakening of great power consciousness. The internationalization of China's higher vocational education has formed an internationalization circle model covering three modes of domestic internationalization, foreign internationalization and comprehensive internationalization. , And is committed to cultivating talents with international skills; however, in the process of this transformation, the internationalization of higher vocational education takes slightly different forms at different stages. There are also different focuses on the choice of activities, organizations or concepts, but both Reflects the idea that education serves the national strategy.

**KeyWords** Higher vocational education; Internationalization; National Strategy; Development Strategy

With the dynamic evolution of economic globalization and world multi-polarization, competition among major countries and regions has intensified, and the international development of higher education has become an important way for countries to broaden cultural exchanges and channels, enhance overall national strength and competitiveness, and realize national strategies. Higher vocational education is an important type of higher education, and its international development is also an important concern at present. In 2020, there are 2,738 regular colleges and universities nationwide, of which 1,468 are higher vocational (technical) colleges, accounting for 53.61% of the total number of colleges and universities, an increase of 0.67% compared to 2019. The number of students in higher vocational (collegiate) schools is about 14.595 million, accounting for 44.43% of the entire scale of higher education, an increase of 2.18% compared to 2019. The number of higher vocational colleges and the scale of students have become an important part of the scale of higher education, and the internationalization of higher vocational education has gradually become an important part of the internationalization of higher education.

## **1. The clarity of the connotation of the internationalization of China's higher vocational education**

In the research on the connotation of the internationalization of higher vocational education, there are generally four views: one is to treat internationalization as a process of cross-border, cross-national, and cross-cultural exchanges and cooperation that integrates ideas, organizations

and activities; As a development path for the modernization of higher vocational colleges, the third is to regard internationalization as an activity of market-oriented configuration; the fourth is to regard internationalization as a manifestation of the achievement of the goal of international talent training. This research mainly adopts the first point of view. It is believed that "transformation" in the internationalization of higher vocational education is a verb, which is a process of multi-element, multi-subject, multi-form cooperation and communication. As well as the purpose of the role, the "internationalization" is discussed.

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### **1.1 The internationalization of higher vocational education: a special form of the internationalization of higher education**

The internationalization of higher vocational education is an important part of the internationalization of higher education. The analysis of the definition of the internationalization of higher education is conducive to the understanding of the internationalization of higher vocational education. It is generally believed that the internationalization of higher education is based on people's transnational recognition of the universality of knowledge. Higher vocational education is a type of higher education with technology and application as the core. Compared with the knowledge transfer and exchange of higher education, technology is more easily recognized and widely exchanged between countries, and even in the world. Furthermore, cross-border and openness are important attributes of vocational education. In terms of value orientation and core elements, higher vocational education has natural adaptability in the process of internationalization. On this basis, the internationalization of higher vocational education is defined as a strategic path characterized by school-enterprise cooperation, international training, obtaining vocational qualification certificates, participating in international vocational qualification skill competitions and project scientific research to improve the quality of talent training and meet the needs of regional economies. Demand for international talents.

### **1.2 Concept organization and activities: the content elements of the internationalization of higher vocational education**

Drawing on the elements of the internationalization of higher education and combining the characteristics of professionalism, many scholars have proposed the elements of the internationalization of higher vocational education, such as international education concepts, international training goals, international courses, international exchanges of personnel, and international experimental training. There are seven aspects of internationalization, international academic exchanges and cooperative research, and international sharing of educational resources. Based on this, more scholars have established a "plane 8-dimensional coordinate system-spider web model" to measure the degree of internationalization of higher vocational colleges. The stratification of these elements by scholars can be roughly summarized into three levels: concept, organization, and activity. The conceptual level covers educational concepts, educational thoughts, etc., the organizational level covers international institutions, institutional norms, etc., and the activity level covers the internationalization of teacher-student exchanges, the internationalization of the teaching process, and the internationalization of courses. The degree of internationalization ranges from activity to organization to The concept gradually deepens.

### **1.3 The circle model of internationalization: various forms of the internationalization of higher vocational education**

When studying the internationalization of higher education, Canadian scholar Knight (J.) proposed the "circle model of internationalization", which divided internationalization into three development models from the direction dimension: Internationalization at home, Internationalization abroad and Internationalization two-way. For China's higher vocational education that is in a "late-comer" state, due to the initial cost and insufficient resources, the internationalization of higher vocational education is at a relatively low level. With the deepening of practical exploration and theoretical research, the internationalization of higher vocational education has gradually changed from integrating internationally accepted qualifications, standards or paradigms into the curriculum, teaching, research and school governance of higher vocational colleges to passing international competitions, International education, internship and employment, foreign aid training programs, etc. In order to truly promote the development of internationalization and standardization of higher vocational education, it is necessary to improve the construction of non-system level, realize the docking at the conceptual level, and "transform" the internationalization results of higher vocational education into China's educational development, economic transformation and national strategic services.

### **1.4 International skilled talents: the goal of the times for the internationalization of higher vocational education**

Higher vocational education is based on the main task of cultivating high-end skilled professionals in production, construction, service, and management, with the main function of serving regional economic and social development. The fundamental purpose of the education internationalization of higher vocational colleges is to cultivate international talents. In the reality of global economic integration and China's new industrialization and modernization road, technical and technical talents with international competitiveness have become an important support guarantee. Therefore, the new development actually requires the internationalization of higher vocational colleges, and even more international technical and skilled talents, who can adapt to the development of globalization and the information society, can adapt to the diversified social work environment, and have the support of basic operational skills. , With the support of advanced professional skills, and diversified abilities such as foreign language application ability, global awareness and international competitiveness, cross-cultural communication ability, and familiarity with WTO rules.

## **2. Analysis of the motivation of the internationalization of China's higher vocational education**

### **2.1 The actual needs of national interests-surface factors of the internationalization of higher vocational education**

Economic globalization has accelerated the international division of labor in the labor market and the formation of world resource markets such as material, capital, manpower, and information. Under the influence of these economic factors, to gain share in the world market and allocate human resources, it is necessary to communicate international rules, standards and norms through various forms, vigorously develop higher vocational education that is in line with international standards and has international influence, and cultivate International high-quality technical and skilled talents. When entering the 21st century, a globalized knowledge network has gradually formed under the development of networking in the information age, and education between countries and between regions is closely linked. In this context, higher vocational education promotes the process of internationalization, Can obtain the academic resources and intellectual wealth of other countries, and can share the technological achievements of the country. In addition, the acquisition of cultural dominance has increasingly become an important factor in the improvement of the country's comprehensive national strength. Globalization is not only the globalization of economy, but also the globalization of culture. In the context of rapid global talent and labor mobility, the acquisition of cultural dominance can more effectively influence the culture, society, political system and ideology of other countries.

### **2.2 Communities and the consciousness of a big country-deep-seated factors of the internationalization of higher vocational education**

The ideal needs of building a community with a shared future for mankind. In November 2012, at the 18th National Congress of the Communist Party of China, it was proposed to advocate the "community with a shared future for mankind". Under the trend of political multi-polarization, economic globalization, cultural diversification, and social informatization, the world is becoming more and more closely connected. Face many challenges. Until October 2019, the Fourth Plenary Session of the 19th Central Committee of the Communist Party of China has been advocating the global values of the community. Under this value, the concept of international power, common interests, sustainable development, and global governance are all deeply affecting China's independent foreign policy of peace, as well as China's cultural education. In this context, China has signed 201 cooperation documents for the joint construction of the "Belt and Road" with 138 countries and 31 international organizations. The proposal of this strategy is to practice community building and promote the implementation of international cooperation, mutual benefit, and co-

construction and sharing. The promulgation of this strategy also provides a good opportunity for the internationalization of higher vocational education.

Realistic demands for the awakening of China's consciousness of being a great power. China is one of the four ancient civilizations, and our culture has a long history. Today, China has also become the world's second largest economy, the world's largest manufacturing country, and the world's largest trading country. It has unlimited potential. The consciousness of being a big country and being a powerful country is of great significance to China's mediation in international relations and the satisfaction of national interests. In the future development trend, the cultivation of international talents in higher vocational education requires technical and skilled talents with long-term vision, an extremely strong driving force, a deeper sense of national pride and a sense of fulfillment of life, and take the initiative to assume more international responsibilities.

### **3.The development strategy of the internationalization of China's higher vocational education**

In 2019, the Ministry of Education and the Ministry of Finance promulgated the "Opinions on the Implementation of High-level Higher Vocational Schools and Professional Construction Plans with Chinese Characteristics" (Jiaozhicheng [2019] No. 5). Features a development path with high water evaluation. Therefore, we mainly choose data and cases after 2019 for analysis.

#### **3.1 Changes in the overall level of internationalization of higher vocational education**

Due to the impact of the epidemic, the flow of personnel has been restricted, and the number of students and teachers going out has been drastically reduced. In 2020, the internationalization of China's higher vocational education will be frustrated. Compared with the index of "the number of curriculum standards developed and adopted outside the country" in 2019, the other indicators are all negative growth. However, the indicators for the internationalization of higher vocational education in 2020 are all positive numbers, and the number of professional teaching standards developed and adopted abroad (the number of curriculum standards developed and adopted abroad) Based on the internationalization indicators of "going out" and "going in" such as the "number of awards in the foreign skills competition" and "the number of schools running abroad", the values in 2019 and 2020 are roughly the same.(as shown in Table 1).

Table 1 The international influence of China's higher vocational education from 2019 to 2020

	Index	Unit	2019	2020	Increment
1	Training volume of foreign (overseas) personnel	Man day	4331095	3419468.77	-911626.23
2	Internship time for students serving "going out" companies abroad (overseas)	Man day	1103683	2659	-1101024
3	Time for full-time teachers to guide and carry out training abroad (overseas)	Man day	338246	192439.92	-145806.08
4	Number of full-time teachers holding positions in professional organizations abroad (foreign)	Man	1662	28	-1634
5	Number of professional teaching standards developed and adopted by foreign countries	pcs	958	908	-50
6	Number of curriculum standards developed and adopted abroad	pcs	5649	5783.07	134.07
7	Number of awards in foreign (overseas) skill competitions	item	1938	1535.45	-402.55
8	Number of schools running abroad (overseas)	pcs	304	205.02	-98.98

Note: The data comes from the 2019-2020 annual report on the quality of higher vocational education in various regions.

### 3.2 Different development stages of the internationalization of China's higher vocational education

By combing through the experience explored in the international exchange and cooperation part of the 2019-2020 China Higher Vocational College Quality Annual Report, and comparing the previous development experience, it can be found that the internationalization process of higher vocational education has taken slightly different forms at different stages. Different, they also have their own focal points in the choice of activities, organization or concepts, but they all reflect the concept of education serving the national strategy (as shown in Table 2).

Table 2 2019-2020 Different Forms of Internationalization of Higher Vocational Education in China (Parts)

Form	Content	Stage
Introduce foreign (overseas) educational resources	Beijing will carry out TAFE education model reform experiments in accounting and pre-school education majors in some middle and higher vocational colleges, including Beijing Vocational College of Finance and Trade, Beijing Youth Political College, Beijing Agricultural Vocational College, Beijing Vocational College of Economics and Management, etc. 4 higher vocational pilot schools .	Bring in
Widely attract overseas students	In February 2020, the Beijing Municipal Education Commission, the Foreign Affairs Office of the Beijing Municipal People's Government, and the Beijing Municipal Public Security Bureau jointly issued the "Administrative Measures for the Recruitment and Training of International Students in Higher Education Institutions in Beijing";	Bring in
Overseas school	The Egypt-China Institute of Applied Technology jointly established by Beijing Vocational College of Information Technology, Egypt and Suez Canal University and Egypt MEK Foundation;	Go out
Specialized international organization	Jiangsu Province has established three Chinese and foreign school cluster cooperation platforms, including the Jiangsu American Higher Vocational Education Cooperation Alliance, the Jiangsu German Higher Vocational Education Cooperation Alliance, and the "Belt and Road" Talent Training Higher Vocational College Cooperation Alliance.	Go out
Appropriate development of Sino-foreign cooperative education projects	In 2020, 4 higher vocational colleges in Jiangsu Province will be awarded the "China-ASEAN Special Cooperation Project for Higher Vocational Colleges". The project is funded by the Special Fund for Asian Regional Cooperation of the Ministry of Foreign Affairs. It is planned to be implemented in 5 years and 20 characteristic projects are selected each year , In order to establish a long-term and stable institutionalized cooperation platform in the field of vocational education.	Go out
Send domestic teachers to study abroad	In 2019, Wuhan Railway Vocational and Technical College held a dialogue with Pima Community College in the United States, and exchanged ideas on teacher research and training projects.	Go out
Overseas school + language training service	"Chinese language + vocational education" independent Confucius classroom for enterprise employees with Chinese language and culture and industrial Chinese teaching as the main task. "Chinese language + vocational education" independent Confucius classroom for enterprise employees with Chinese language and culture and industrial Chinese teaching as the main task classroom.	Go into
Build an international brand of China's higher vocational education	In December 2019, the Chinese technical team went to Egypt for equipment installation and commissioning and on-site teacher training. At the beginning of 2020, six Luban workshops in Nigeria, Egypt, Uganda, Côte d' Ivoire, and Madagascar successfully held a cloud unveiling ceremony and started operations.	Go into

Note: The data comes from the 2019-2020 annual report on the quality of higher vocational education in various regions.

### 3.2.1 "Bring in"-individual combat in higher vocational internationalization

Widely attract overseas students. Some higher vocational colleges with higher levels of teaching and management attract foreign students through their own

advantages. This development strategy is also the most direct way for countries around the world to understand China. In the development of this form, the initial government, social organizations and higher vocational colleges all set up special scholarships to encourage overseas students. At the beginning of the development, due to the concern about the size of the students, the reasonable and standardized management of the international students was not carried out, resulting in the uneven source of students, and the quality of the students needs to be improved. In addition, the quality of education in domestic higher vocational colleges is still at a low level, and the degree of internationalization of curriculum and teacher levels is not high, resulting in poor education for overseas students in higher vocational education. In addition, due to the impact of the epidemic, the number of overseas students in various places has begun to decline. For example, in Beijing, as of September 2020, the number of full-time foreign students (over one year) in Beijing's higher vocational colleges is 579, compared with 2019. Of 684 people fell by 15.4%.

Introduce educational resources from abroad (overseas). The first is to introduce international general qualification certificates, foreign teaching standards and curriculum standards, conduct higher vocational education and teaching in the country, and directly use international standards to reduce the cost and obstacles of labor circulation in the world market. In addition, special international education courses, new courses or special lectures on international themes, and international content are added to the original courses directly on the basis of the country. For example, Nanjing Industrial Vocational and Technical College draws on foreign vocational education models to develop international business ( Sino-foreign cooperation) software technology courses. The second is to introduce foreign skilled personnel training models, such as the German "dual system", the British BTEC model, and the Australian TAFE model promoted by China, which all learn from foreign development models. The third is to introduce foreign teachers. Attract excellent foreign teachers' resources through scientific research projects, financial support, good working environment and high salaries, and build the faculty of domestic higher vocational colleges. It is also possible to hire experts to the school regularly or irregularly to exchange academic and teaching issues, and to improve the curriculum plan with the teachers in the school. The fourth is to develop bilingual classes to cultivate bilingual talents who can actively communicate and cooperate with overseas.

### **3.2.2 "Going out"-a joint action for the internationalization of higher occupations**

Carry out projects that encourage students to go out. The first is to implement student inter-school exchange projects. In the form of holding "internationalized pilot classes", vigorously develop inter-school exchange programs based on mutual recognition of credits, exchange of diplomas, cross-border segmented training,

etc., to provide students with an upward channel for studying abroad. The second is to implement summer overseas study and social practice projects that combine development, study and inspection of students' summer overseas study projects to expand students' international horizons. The third is to implement students' overseas internship training projects. By broadening the field of internship training for vocational students, promote students' internship and employment overseas. The fourth is to participate in the International Skills Competition. Promote China's skill level and characteristics through competitions, and increase the international reputation of higher vocational colleges.

Send domestic teachers to study abroad. Implement professional team overseas training projects, key teachers overseas training projects, key teachers overseas exchange projects (less than half a year to exchange at partner institutions), and key teachers overseas visiting scholar projects (six months to one year) to increase teachers' overseas learning and practice experience, Enhance teachers' international vision and "bilingual and dual education" ability.

Appropriate development of Sino-foreign cooperative education projects. The form of this project is embodied in the cooperation of higher education institutions and overseas higher education institutions to run schools, covering mutual recognition of credits, the establishment of overseas branch schools (colleges), independent colleges, etc., and the construction of overseas branches with the participation of multinational companies. This is also a relatively mature method for the international development of higher vocational education. In addition, with the cross-border and transnational activities of Chinese enterprises, higher vocational colleges have also obtained opportunities for transnational skills training. For example, Weifang Vocational College has established 3 international vocational skills training centers in Congo (Kinshasa), Uganda, and Pakistan. .

Establish specialized international organizations. In the current practice of higher vocational colleges, there are three main forms of international organization, one is the international education center attached to other departments, the other is the independent international cooperation and exchange office, and the other is the secondary college International colleges in the form of schools, etc. The establishment of these organizations mainly serves the teaching and management of international work in higher vocational colleges, making these work more standardized and efficient.

### **3.3.3 "Go into"-the direction of the internationalization of higher vocational education**

Co-build the "Luban Workshop" to create an international brand for China's higher vocational education. The increase in the construction of "Luban Workshops"

has been a national strategy. In 2018, Tianjin built 7 "Luban Workshops" in Thailand, Britain, India, Indonesia, Pakistan, Cambodia, and Portugal, 5 of which were higher vocational colleges. . The integration of production and education and school-enterprise cooperation are important features of higher vocational education, and they are also of great value in the process of promoting the internationalization of higher vocational education. In line with the current implementation of China's "One Belt, One Road" strategy, in the process of internationalization of higher vocational education, it will form a community with international companies and conform to the professional standards of international companies. And actively explore the characteristics of higher vocational education in the country, improve the quality and connotation construction of higher vocational education, and increase the international influence of China's higher vocational education. On the other hand, relying on foreign aid policies, foreign aid training projects have been opened. With the help of these projects to raise the country's awareness of being a big country, and to achieve "two-way" higher vocational education exchanges, not only the mode and experience of China's vocational education will be passed on to developing countries, but also the international influence of China's vocational education will be expanded. Just as the Zhangzhou Vocational College of Science and Technology actively undertakes foreign aid training projects for developing countries with tea as a medium, it has organized 24 sessions and trained 544 students from 49 countries, involving tea processing, tea food processing, tea industry development and tourism, and tea trade. And other fields. This project allows Chinese tea culture and tea technology to spread all over the world.

Conform to the cultural output strategy and carry out language training services. In the process of internationalization of higher vocational education, we must not only see the excellent resources of other countries, but also the precious Chinese nation's excellent culture. Through language input, skills output and standard output gradually satisfy foreign scholars and students' interest in Chinese culture and skills learning, and on the other hand, it also expands China's ability to serve the world. In the context of the continuous improvement of China's international status and the increasing influence and attractiveness of national culture, vigorously promoting foreign cooperation projects and overseas Confucius Institutes will be more conducive to foreign scholars and students to understand the development of China's higher vocational education in the Chinese context. Just like the "Panda School" of Chengdu Vocational and Technical College, in 2018, 12 primary and secondary schools in Thailand carried out 3 months of training in Chinese as a foreign language, calligraphy, and tea art. Shandong Vocational College of Technology and the Bangkok Vocational Education Center in Thailand jointly built the Confucius Six Arts School, designed and carried out academic education and vocational training in accordance with the "Chinese + culture + profession + industry" model.

Strengthen the quality of teachers and students. Carry out the talent training model of "professional skills + multi-language + Chinese feelings", and establish

an international education concept. Examining the standards, content, levels and mechanisms of talent training with a global perspective, and using a talent training model that combines skills, language and feelings, not only enables international talents to have strong competitiveness, but also to adapt to the needs of international development, and strengthen The circulation of talents has improved the original intention of international talents to meet internationalization. Focus on the national interests of the country, focus on domestic development strategies, and support the transformation and development of the country's economic structure. Under such a talent training model, teachers in higher vocational colleges should also have the concept of internationalization of higher education, teaching ability with a strong international vision, and the ability to communicate internationally.

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# **Transformation of Chinese Vocational Education and Training: from Quantity Expansion to Quality Improvement**

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## **Abstract**

To meet the needs of international competition, socialist modernization and economic transition, Chinese vocational education and training has made a significant transformation in recent years. This research discusses the transformation manifested as a leap from quantity expansion to quality improvement. Focusing on the quantity-to-quality leap, the research topic can be divided into three research questions: why Chinese vocational education and training need to be transformed; what China has done to realize this transformation; what has been changed during this transformation. Four parts are presented to answer the research issues: the first part of the research generally analyzes the background in which Chinese vocational education and training has made progress; the second part demonstrates specific measures described to realize the quantity-to-quality transformation, from the aspect of increasing the educational vitality, enhancing teaching and training efficiency, improving management and evaluation methods and completing external guarantee mechanism; some detailed examples are given in the third part to prove that schools and relevant stakeholders have already taken actions to improve the quality of vocational education and training; the last part interprets the inspiring outcomes including the educational resources enriched, teachers' teaching ability strengthened, students' employability enhanced and the quality assurance system promoted. The research mainly uses the qualitative analysis on policy versions promulgated by China' Ministry of Education for years and on implementing cases made by schools, enterprises and other organizations.

**Key words:** Chinese vocational education and training; quality improvement; policies

## 1. Background

### 1.1 The needs of self-development and sustainable development

In recent years, more and more countries have gradually realized the importance of improving the quality of vocational education and training and accordingly introduced relevant policies. Russia and America follow this global trend to promote the development of vocational education and training. “The Modernization of Russian Education Before 2010”(2010年前俄罗斯教育现代化构想) is issued by the Government of the Russian Federation to build the quality assurance system of education; “Investing in America's Future: A Blueprint for Transforming Career and Technical Education” issued by U.S. Department of Education also highlights the importance of strengthening education system to equip students with vocational skills. This global trend also reflects the internal law of education development: the focus changes from quantity to equity to quality. With the financial abundance and technological advancements, the aim of providing everyone with proper educational opportunities has been realized to some extent. Finishing the task of expanding education scale and giving equal opportunities, improving the quality of education and training becomes the focusable aim. In case of being the disconnection between education and the real world of work, it's necessary for education to continuously refresh and make reforms, fostering newly talents for social and economic development.

Education including vocational education and training is a necessary foundation for learning and living in a more complicated and rapidly changing world. Nowadays, global wealth is growing at breakneck speed while “unsustainable patterns of economic production and consumption contribute to global warming, environmental degradation and an upsurge in natural disasters”.<sup>1</sup> Education is asked as well as able to find sustainable ways of responding to these challenges. It is possible to transform people's mind-set into sustainable thinking and then shape sustainable living and production behaviors of people by means of education. To realize these amazing shifts, one important premise is improvement in the quality of education.

### 1.2 The needs of economic development

In China, economy is undergoing deep transition and upgrading, calling for new forms of vocational education and training to cultivate the talents needed in the

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<sup>1</sup> UNESCO. Rethinking Education: Towards A Global Common Good[EB/OL]. <http://unesdoc.unesco.org/images/0023/002325/232555e.pdf>, 2016-03:10.

labor market. Formulating “Made in China 2025” strategy, implementing “Internet Plus Action Plan” and promoting popular entrepreneurship and innovation, China’s economic development has entered a new model. To create more dividend of qualified personal as well as to transform China from a manufacturer of quantity to one of quality, improving the quality of vocational education and training is imperative. Vocational education and training plays a key role in facilitating students and workers with knowledge, skills and competencies contributing to economic transition and industry upgrading. In the 2016 Report on the Work of the Government ( 政府工作报告 ), it says that by 2020 the labor productivity should rise from 87,000 to over 120,000 and the contribution of technology advancement to economic growth should account for 60%. <sup>2</sup>This milestone can be realized through nurturing high quality people with information technology, innovation, creativity ability and other requiring knowledge and skills. The need of fostering new type talents pushes the quality improvement process of vocational education and training.

## **2.Policies Moves**

Improving the quality of vocational education and training has become a common sense in China and a series of policies have been introduced. In 2019, the State Council of P.R.China issued a circular Reform Plan for China’s Vocational Education ( 国家职业教育改革实施方案 ), detailing the reform plan for China’s vocational education to cultivate high-quality workers and technical personnel. The circular said that by 2022, 50 high-level advanced vocational schools with 150 key majors should be established, and a national standard system of vocational education that covers most industries and meets international advanced levels will be created. Enterprises will show more willingness to participate in vocational education, and teachers with both theoretical and practical skills will account for over half of the total number of professional teachers.

These polices moves are trying to promote the quality improvement process from four aspects: increasing the educational vitality, enhancing teaching and training efficiency, improving management and evaluation measures as well as completing external guarantee mechanism.

### **2.1 Increasing the educational vitality**

To increase the educational vitality is to improve the education and training quality from the beginning. Two specific measures play the “gatekeeper” role: involving enterprises into school running and reforming the recruitment system, the former one is aimed at matching school teaching with enterprise production while the latter one hopes to enroll diversified talents with different specialties.

The school-enterprise cooperation is a general model to involve enterprises into school running. The “Innovation and Development Action Plan of Higher Vocational Education” ( 高等职业教育创新发展行动计划 ) points out that higher vocational education colleges and local enterprises are encouraged to make cooperation on school running and personnel training so as to create a win-win situation.<sup>3</sup> In this model, enterprises and schools cooperate to recruit students, design courses, carry out teaching and training programs, evaluate students’ performance and so on. Besides, the productive training base, technique service and product development center as well as entrepreneurship practice platform are required to build by schools and enterprises. After building the above-mentioned organizations, it is predictable that the technical skills accumulation capacity of vocational education and training colleges as well as the seeking and creating employment capability of students will be improved.<sup>4</sup> ( 教育部关于深化职业教育教学改革全面提高人才培养质量的若干意见 ) What’s more, one thing should be highlighted is the apprenticeship of the school-enterprise cooperation model. In the “Opinions on Carrying Out Apprenticeship Pilot of Ministry of Education”( 教育部关于开展现代学徒制试点工作的意见 ), the importance of apprenticeship is described as realizing five connections between school majors and industrial needs, curriculum content and professional standard, teaching process and manufacturing process, graduation certificate and professional certificate, lifelong learning and vocational education and training.<sup>5</sup> To successfully implement apprenticeship, students recruitment and workers employment should be combined, working and learning should be integrated, school teachers and enterprise masters should make cooperation on students training, teaching management and quality supervision system should be established.

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<sup>3</sup> Ministry of Education of the People’s Republic of China. Innovation and Development Action Plan of Higher Vocational Education[EB/OL]. [http://www.moe.gov.cn/srcsite/A07/moe\\_737/s3877/201511/t20151102\\_216985.html](http://www.moe.gov.cn/srcsite/A07/moe_737/s3877/201511/t20151102_216985.html), 2015-10:12.

<sup>4</sup> Ministry of Education of the People’s Republic of China. Opinions on Deepening Vocational Education and Teaching Reform and Improving the Quality of Talent Cultivation of Ministry of Education[EB/OL]. [http://www.moe.gov.cn/srcsite/A07/moe\\_953/moe\\_958/201508/t20150817\\_200583.html](http://www.moe.gov.cn/srcsite/A07/moe_953/moe_958/201508/t20150817_200583.html), 2015-07-25:5.

<sup>5</sup> Ministry of Education of the People’s Republic of China. Opinions on Carrying Out Apprenticeship Pilot of Ministry of Education[EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s7055/201409/174583.html>, 2014-08-25:1.

To promote students development and select useful talents, the recruitment system of vocational education and training is being reformed based on the principle of social equity. In 2013, the Ministry of Education carried out “Opinions on Promoting the Recruitment System Reform of Higher Vocational Education”( 教育部关于积极推进高等职业教育考试招生制度改革的指导意见 ). Examining and evaluating students according to knowledge and skills is proposed in this document<sup>6</sup>, hoping to provide students with various access to higher vocational education and training. Different from the general college entrance examination, the recruitment system of vocational education and training is developing into a distinctive system allowing students make independent choices and schools make diverse admission. For higher vocational education and training, the college entrance examination is a reference describing students’ literacy results. Meanwhile, additional skill achievement is needed to demonstrate students’ general skills level, career orientation, career potential and so on. For national model of higher vocational schools, provincial model of higher vocational schools and apprenticeship pilot schools, separate enrollment arrangement is permitted to be held before the college entrance examination. Based on the results of literacy test, skills test as well as comprehensive quality evaluation in senior high schools, these schools admit the best examinee. At the same time, students winning the prize in skills competition of vocational schools are able to enter schools without taking examinations.

## **2.2 Enhancing Teaching and Training Efficiency**

Vocational education and training schools cultivate talents by means of teaching and training. Hence, enhancing teaching and training efficiency is of significant importance in improving the quality of vocational education and training. In practical terms, it is beneficial to train teachers’ ability and adjust specialty structure so as to enhance teaching and training efficiency.

Considering that knowledge and information is accumulated and updated at a fantastic speed, it’s necessary for teachers to renew their personal ability in time. Teacher training is regarded as a useful way to enhance teachers’ professional and teaching capacity in this knowledge-explosion age. The “Opinions on Improving Higher Education Quality of Ministry of Education”( 教育部关于全面提高高等教育质量的若干意见 )suggests that higher vocational schools should attach importance to develop double-qualified teachers with both teaching qualification and professional qualification.<sup>7</sup> The strengthening of teaching staffs construction is also highlighted

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<sup>6</sup> Ministry of Education of the People’s Republic of China. Opinions on Promoting the Recruitment System Reform of Higher Vocational Education[EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s3258/201306/152732.html>, 2013-04:1.

in the “National Medium and Long-term Educational Reform and Development Program (2010-2020)( 国家中长期教育改革和发展规划纲要 )” and the “Decisions on Accelerating Vocational Education of the State Council”( 国务院关于加快发展现代职业教育的决定 ). Enterprises and vocational schools are required to make cooperation on building the training base of double-qualified teachers; vocational schools should employ full- and part-time teachers with practical experience or high-level skills; teachers are asked to make enterprise practice regularly; enterprises staff are encouraged to hold the post of teachers in vocational schools and the teaching experience is part of their performance evaluation. Except for teachers’ teaching and professional capacity, their research and IT application ability should also be strengthened. The teacher training should be held every five years. In addition, the “Opinions on Carrying Out Apprenticeship Pilot of Ministry of Education”( 教育部关于开展现代学徒制试点工作的意见 ) points out the importance of teaching staffs construction in implementing apprenticeship. Considering that teaching and training task is taken by teachers and employees, it’s necessary to promote the mutual engagement and research cooperation between schools and enterprises. To inspire teachers and employees, some rewards are given: teachers who offer technical service and make enterprise practice have more chance of job promotion; employees who teach students can enjoy teaching allowance.<sup>8</sup>

With the economic development, some newly industries and occupations emerge in the society. In China, the “Made in China 2025” strategy and “Internet Plus Action Plan” are in full swing, catalyzing some high and new technology industries; the “One Belt and One Road” is pushing the development of industrial clusters; some much-needed industries like agriculture, manufacture and services are being upgraded through the use of science and technology. Hence, vocational schools are required to adjust their specialty structure according to economic needs. The “Opinions on Deepening Vocational Education and Teaching Reform and Improving the Quality of Talent Cultivation of Ministry of Education”( 教育部关于深化职业教育教学改革全面提高人才培养质量的若干意见 ) indicates that newly professionals related to newly industrials should be build; current professionals relate to traditional industries should service the upgrading, lowcarbonization and intelligence of those industries. Moreover, it’s necessary to build professional clusters in response of industrial clusters. For much-needed industries of China, building model professionals can drive

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<sup>7</sup> Ministry of Education of the People’s Republic of China. Opinions on Improving Higher Education Quality of Ministry of Education[EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk\\_146673.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk_146673.html), 2012-03-16:5.

<sup>8</sup> Ministry of Education of the People’s Republic of China. Opinions on Carrying Out Apprenticeship Pilot of Ministry of Education [EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s7055/201409/174583.html>, 2014-08-25:4.

the development of the whole industries. A dynamic regulation system of specialties will help to release warming information of specialties adjustment.<sup>9</sup> In addition to economic needs, other factors like school conditions and local characteristics influence the specialty structure of vocational schools. Therefore, the “Opinions on Improving Higher Education Quality of Ministry of Education” (教育部关于全面提高高等教育质量的若干意见) highlights higher vocational schools’ autonomy on specialty setting. Except specialties controlled by the nation, higher vocational schools are able to set other specialties independently.<sup>10</sup>

### **2.3 Improving Management and Evaluation Measures**

Educational management and evaluation measures influence teaching and training efficiency and effectiveness a lot while teaching and training decides the final quality of vocational education and training to some extent. In consequence, to improve educational management and evaluation measures is to improve the quality of vocational education and training. Specifically speaking, educational management hopes to standardize the teaching and training process and educational evaluation is aimed at accessing and evaluating the teaching and training quality.

Improving management levels helps to promote the connotative development of vocational schools and assure the quality of talent cultivation. In 2015, the Ministry of Education publishes a document about educational management improving and that is “Action Plan on Improving Management of Vocational School (2015-2018)”. (职业院校管理水平提升行动计划) Focusing on the strengthening of management capacity, vocational schools are required to update management philosophy, complete management standards, innovate operating system and so on. There are several detailed references in management improving. *The school mission*. It’s required for school mission to meet the needs of economic development and students’ all-round development and to combine working and learning. *The institution system*. The headmaster is in main charge of school with representatives from enterprises, teachers, students and other social stakeholders involved in school running and teaching. *The school charter*. The school charter should be formulated on the basis of national laws

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<sup>9</sup> Ministry of Education of the People’s Republic of China. Opinions on Deepening Vocational Education and Teaching Reform and Improving the Quality of Talent Cultivation of Ministry of Education[EB/OL]. [http://www.moe.gov.cn/srcsite/A07/moe\\_953/moe\\_958/201508/t20150817\\_200583.html](http://www.moe.gov.cn/srcsite/A07/moe_953/moe_958/201508/t20150817_200583.html), 2015-07-25: 3-4.

<sup>10</sup> Ministry of Education of the People’s Republic of China. Opinions on Improving Higher Education Quality of Ministry of Education[EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk\\_146673.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk_146673.html), 2012-03-16:2.

and school characteristics. And with the help of information technology, all staffs cooperate to work efficiently around the school charter. *The teaching team.* Full-time teachers should possess excellent teaching ability and proper practice experiences; part-time teachers should be strictly selected from enterprises to promote school teaching and training; teacher training fund should account for 5% of school public fund per year. *The teaching management.* Specialties are related to industrial needs and curriculum contents are in accordance with professional standards; teaching activities and practice activities are scientifically arranged; students are equipped with favorable professional ethics and strong professional capacity. *The student management.* The student management system contains management of recruitment, registration , behaviors, activities as well as scholarship, employment, entrepreneurship and health. *The financial management.* There are special people and organizations in charge of school budget in vocational schools. And the financial information is issued publicly pursuant to laws. *The research management.* Organizations and systems are build to manage teaching research; platforms and funds are provided to promote research activities; schools are encouraged to make cooperation with enterprises on scientific research and serve the society by means of scientific gains.<sup>11</sup>

Educational evaluation is of significant meaning in describing the teaching and training quality as well as pointing out area for improvement. This evaluation is mainly manifested in the form of annual quality report. Higher schools are required to establish annual quality report publishing system<sup>12</sup> and this system is finally established in 2012. The annual quality report contains school conditions, student development, graduate employment, education reform and effect, government resumption, local community service, problems, future and so on. School conditions are showed in the form of “resource table” including indicators reflecting quality and quantity of teachers, equipment use and student practice. (Table 1) Graduate employment is described by means of “score card” including indicators reflecting the quality and quantity of employment. (Table 2)<sup>13</sup> In 2015, “Action Plan on Improving Management of Vocational School (2015-2018)” (职业院校管理水平提升行动计划) suggests that secondary vocational schools should also establish the annual quality report system and this suggestion is emphasized in the “Notice on Implementing Annual Quality Report System of Secondary Vocational Schools of Office of the Ministry of Education” (教育部办公厅关于开展中等职业教育质量年度报告的通知) An outline is provided as a reference for secondary vocational schools and

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<sup>11</sup> Ministry of Education of the People’s Republic of China. Action Plan on Improving Management of Vocational School (2015-2018) [EB/OL]. [http://www.moe.edu.cn/jyb\\_xwfb/s271/201509/t20150917\\_208782.html](http://www.moe.edu.cn/jyb_xwfb/s271/201509/t20150917_208782.html), 2015-09-17.

it is composed of basic information (school scale, equipment and teaching staff), student development(student quality and employment quality), quality assurance strategies(specialty structure, quality monitoring system and teacher training), school-enterprise cooperation(cooperation program and student practice), social contribution(skilled personnel cultivation, social service and partner assistance), government performance(fund and policy), characteristics and creations, problems and improvement measures. The Ministry of Education and Department of Education of provinces are asked to design report column in the official internet to publish annual quality reports in different districts. <sup>14</sup>

Table 1 Resource table

Indicators		Unit	2012	2013
1	Student-teacher rate	-		
2	Double-qualified teacher-all teachers rate	%		
3	Enterprises practice time of full-time teacher	Day		
4	Specialty teaching time of part-time teacher from enterprise	%		
5	Equipment cost per student	Yuan/student		
6	Practice time within school training base per student	Hour/student		
7	Practice time in training base outside school per student	Day/student		

## 2.4 Completing External Guarantee Mechanism

To improve quality of vocational education and training, it is of great necessity to complete external guarantee mechanism. Expenditure guarantee, resources support

<sup>12</sup> Ministry of Education of the People’s Republic of China. National Medium and Long-term Educational Reform and Development Program (2010-2020) [EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe\\_838/201008/93704.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_838/201008/93704.html), 2010-07-29:16.

<sup>13</sup> Vocational &Adult Education Department of the Ministry of Education of the People’s Republic of China. Notice on Submitting Annual Quality Report of Higher Vocational Schools (2014) [EB/OL]. [http://www.moe.gov.cn/s78/A07/A07\\_gggs/A07\\_sjhj/201311/t20131113\\_159343.html](http://www.moe.gov.cn/s78/A07/A07_gggs/A07_sjhj/201311/t20131113_159343.html), 2013-11-11:3.

<sup>14</sup> Ministry of Education of the People’s Republic of China. Notice on Implementing Annual Quality Report System of Secondary Vocational Schools of Office of the Ministry of Education[EB/OL]. [http://www.moe.edu.cn/srcsite/A07/s7055/201601/t20160126\\_228908.html](http://www.moe.edu.cn/srcsite/A07/s7055/201601/t20160126_228908.html), 2016-01-12:3-4.

and legal insurance mainly consist of the external guarantee mechanism.

Expenditure is indispensable in school management, staff employment, schoolhouse building, equipment purchase and so forth. Adequate funding for hardware and software construction acts as a strong guarantee for the quality improvement process of vocational schools. Hence, special funds have been allocated to support school running in recent years. The State Council has issued “Opinions on Increasing Education Input of the State Council”( 国务院关于进一步加大财政教育投入的意见 ) emphasizing the importance and urgency of education input. It is required that the ratio of education expenditure in the public expenditure should be feasibly increased, the source of funds should be broadened and the efficiency of fund usage should be enhanced.<sup>15</sup> In 2014, the Ministry of Finance allocates 4 billion to improve school-running conditions of secondary vocational schools, up 23.5% over last year. These special funds are mainly used for infrastructure construction like training base building, schoolhouse reconstructing, teaching instrument and literature purchase.<sup>16</sup> To improve school-running conditions is to help secondary vocational schools improve their education quality and then better serve the industrial needs of transforming and updating. Besides, to better improve the efficiency of fund usage, the Ministry of Finance publishes “Opinions on Establishing and Completing the Average Appropriation System Directed by Reform and Performance and Accelerating Development of Higher Vocational Education”. ( 关于建立完善以改革和绩效为导向的生均拨款制度加快发展现代高等职业教育的意见 )In this document, higher vocational schools are required to realize the aim that the financial appropriation per student per year should reach the minimum standard of 12,000 by 2017.<sup>17</sup> Accordingly, the reward and supplement policy is formulated to increase educational investment and improve educational quality. There are two specific policies in this policy and the first policy is appropriation and supplement reward. The Ministry of Finance provides schools reaching the 12,000 aim with financial rewards sustainably. If schools haven’t reached 12,000 before 2017, they can also receive variable financial supplement form the Ministry of Finance. For schools who haven’t realize the 12,000 aim by 2017,

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<sup>15</sup> State Council of the People’s Republic of China. Opinions on Increasing Education Input of the State Council[EB/OL]. [http://www.gov.cn/zwggk/2011-07/01/content\\_1897763.htm](http://www.gov.cn/zwggk/2011-07/01/content_1897763.htm)□2011-07-01:2-4.

<sup>16</sup> Ministry of Finance of the People’s Republic of China. Ministry of Education Allocates 4 Billion to Support Secondary Vocational Schools to Improve School-running Conditions[EB/OL]. [http://jkw.mof.gov.cn/zhengwuxinxi/tourudongtai/201411/t20141115\\_1158559.html](http://jkw.mof.gov.cn/zhengwuxinxi/tourudongtai/201411/t20141115_1158559.html), 2014-11-15.

<sup>17</sup> Ministry of Finance of the People’s Republic of hina. Opinions on Establishing and Completing the Average Appropriation System Directed by Reform and Performance and Accelerating Development of Higher Vocational Education[EB/OL]. [http://jkw.mof.gov.cn/zhengwuxinxi/zhengcefabu/201411/t20141128\\_1161021.html](http://jkw.mof.gov.cn/zhengwuxinxi/zhengcefabu/201411/t20141128_1161021.html), 2014-10-30:3.

the financial supplement will be stopped. The second specific policy is reform and performance reward. According to schools' performance on teaching reform, double-qualified teachers training, community service activities and so on, the Ministry of Finance appropriate funds to reward and encourage higher vocational schools.

The quantity and quality of educational resources influences the quality of talent cultivation. To increase the quantity and quality of educational resources, the high-quality resource sharing system is established. The “Opinions on Improving Higher Education Quality of Ministry of Education”(教育部关于全面提高高等教育质量的若干意见) encourages higher schools to establish resource sharing platform under the cooperation with enterprises and research institutions.<sup>18</sup> For higher vocational schools, they can combine with enterprises to build teaching resource library. The vocational education teaching resource library column has been established in the website “Higher Technical and Vocational Education in China”. Higher vocational schools are able to build their own electronic library and share resources from other schools by means of this website. In order to assure the quality of candidate resource libraries, experts are invited to make evaluation before the candidate is confirmed and make detection afterwards. In addition to this website, a guideline called “Handbook on Building Teaching Resource Library of Vocational Education”(职业教育专业教学资源库建设工作指南) is provided for vocational schools who want to build the teaching resource library. In this handbook, the teaching resource library' function, building process, main content, management measure, construction funds and other factors are explained in detail. The teaching resource library is positioned as a platform for personalized learning of students and flexible teaching of teachers. Schools wanting to build this resource library can make voluntary application and then be accepted and supported by the Ministry of Education if they are excellent enough. Making sustainable update is necessary after the resource library is accepted. The percentage of the newly-updated resources should account for 10% at least.<sup>19</sup> The main contents of the resource library include: specialty introduction, education plan, teaching environment, online course, training program and evaluation system. As for the management measure, a national platform called “vocational education teaching resources library operating and monitoring platform”(国家级职业教育专业教学资源库运行监测平台) has been established to analyze data relevant to resource library

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<sup>18</sup> Ministry of Education of the People's Republic of China. Opinions on Improving Higher Education Quality of Ministry of Education[EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk\\_146673.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s6342/201301/xxgk_146673.html), 2012-03-16:5.

<sup>19</sup> Ministry of Education of the People's Republic of China. Handbook on Building Teaching Resource Library of Vocational Education[EB/OL]. [http://www.moe.gov.cn/s78/A07/A07\\_gggs/A07\\_sjhj/201605/t20160506\\_242282.html](http://www.moe.gov.cn/s78/A07/A07_gggs/A07_sjhj/201605/t20160506_242282.html), 2016-05-05:4.

building and applying. In order to better promote the development of this teaching resource library the central government offers special funds devoted to curriculum development, software design, enterprises case collection, expert consultation and so on. What's more, vocational schools, enterprises or local governments raise project funds by themselves.

Besides the expenditure guarantee and resources support mentioned above, the legal insurance also takes a place in the quality improving process of vocational education and training. In spite of the fact that the vocational education law is still incomplete, the importance and necessity of legislation has been totally realized in China. The “National Medium and Long-term Educational Reform and Development Program (2010-2020)” (国家中长期教育改革和发展规划纲要) has indicated that the vocational education law should be amended based on the needs of economic development and educational reform.<sup>20</sup> The “Decisions on Accelerating Vocational Education of the State Council” (国务院关于加快发展现代职业教育的决定) also lays stress on accelerating the pace of the amendments to vocational education law.<sup>21</sup>

### 3. Cases

A great many policies have been formulated to improve the quality of vocational education and training. Having realized the importance of quality improving, vocational schools, enterprises, local governments and other stakeholders are making efforts to implement relevant policies.

#### 3.1 Cases of increasing the educational vitality

The specific measures used to increase the educational vitality include involving enterprises into school running and reforming the recruitment system. What has been done in involving enterprises into school running is reflected in the annual quality report of enterprises and vocational schools. As for the recruitment system reform, some provinces and districts have already taken action.

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<sup>20</sup> Ministry of Education of the People's Republic of China. National Medium and Long-term Educational Reform and Development Program (2010-2020)[EB/OL]. [http://www.moe.gov.cn/jyb\\_xwfb/s6052/moe\\_838/201008/t20100802\\_93704.html](http://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201008/t20100802_93704.html), 2010-07-29:21.

<sup>21</sup> The State Council of the People's Republic of China. Decisions on Accelerating Vocational Education of the State Council[EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe\\_1778/201406/170691.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_1778/201406/170691.html), 2014-05-02:6.

There are a number of annual quality reports listed in the website “Higher Technical and Vocational Education in China”. In 2016, 273 enterprises from 28 provinces and districts exhibit their annual report in this website. The annual quality report from Ningbo Haitian Group Corporation, making cooperation with Ningbo vocational schools, is selected as an example. Engaging in plastic machinery production, Ningbo Haitian Group Corporation has established partnership with Ningbo Vocational School on teaching, training and employment since 2002. In 2007, Haitian College is built within this vocational school to nurture electro mechanics talents. At present, acting as Ningbo Vocational School’ board, Ningbo Haitian Group Corporation involves in school running from the aspects of resource commitment, order-type cultivation and double-qualified teachers training. The Corporation inputs 6,000,000 for numerical control machine purchasing and 2,020,000 for teaching equipment purchasing. What’s more, a teaching practice building is built with 10,000,000 donate from this Corporation and a training base is established under the school-enterprise cooperation. To promote the order-type cultivation, 69 staffs have participated in school teaching, reaching 1280 teaching hours from 2012 to 2015. Under the order-type cultivation model, the vocational school and enterprise draw up the training scheme, curriculum standards as well as curriculum contents together. Then teachers from the enterprise give guidance on practical operation while teachers from the school teach professional knowledge at school. Afterwards, students begin to practice in enterprise with the help of teachers from both school and enterprise. When students are able to operate expertly, a fixed job will be offered to them with a practice supervisor. From 2012 to 2015, 237 students have participated in Haitian order-type class and got relevant diploma. The last school-enterprise cooperation is made in the form of double-qualified teachers training. In order to strengthen teachers’ professional ability, some special research groups like numerical control machine research group are established for teachers to make deep research on industrial production. Besides, teachers spend their spare time practicing in Haitian Corporation. During teachers’ practicing time, production problems are found and solved by research groups.<sup>22</sup>

The recruitment reform has been tried by Jiangsu province and Shanghai. Complying with “Opinions on Promoting the Enrollment System Reform of the State Council”( 国务院关于深化考试招生制度改革的实施意见 ), Jiangsu province has formulated “Jiangsu Enrollment System Reform Implementation Plan”. The enrollment reform of higher vocational schools is part of this whole reform implementation plan. By the end of 2014, 35 higher vocational schools in Jiangsu province have implemented the separate entrance recruitment reform. Students taking the separate

entrance examination accounts for 20% of all students. In 2015, another 2 higher vocational schools start to participate in the separate entrance recruitment reform.<sup>23</sup>(省教育厅关于做好江苏省 2015 年高职院校单独招生改革试点工作的通知)The separate entrance examination contains literacy examination and skills assessment. The former one is held by Jiangsu Education Examination Authority or higher vocational schools while the latter one is held by higher vocational schools themselves. Students having passed the literacy examination can attend the skills assessment. What's more, students are not allowed to attend other forms of college admission once admitted. This separate entrance should be finished before college entrance examination. In addition to Jiangsu province, Shanghai publishes "Implementation Plan on Promoting the Enrollment System Reform of Higher School"(上海市深化高等学校考试招生综合改革实施方案)as well. In this implementation plan, the separate entrance examination is stressed as evaluation of cultural quality and vocational skills.<sup>24</sup>As the main enrollment channel, the separate entrance examination is held before college entrance examination to increase higher vocational schools' attraction.

### 3.2 Cases of Enhancing Teaching and Training Efficiency

In order to enhance teaching and training efficiency, vocational schools adjust the specialty structure to better equip students with knowledge and skills required by the social economy, and accelerate the process of training double-qualified teachers with the assistance of enterprises to strengthen teachers' professional and teaching ability.

The Ministry of Education has issued some documents to normalize and assist vocational schools in adjusting the specialty structure. "Higher Vocational Education Specialty Management Measures of General Higher School"(普通高等学校高等职业教育专业设置管理办)demonstrates rules and regulations in specialty setting and "Category of Higher Vocational Education Specialty of General Higher School 2015"(普通高等学校高等职业教育专业目录 2015) lists the specific majors of vocational education. Higher vocational schools are required to timely adjust their specialty structure based on these documents. According to the needs of social economy, the specialty type is added every years and the specialty category is revised every 5 years. In the specialty category, there are 19 sorts of specialties(专业大类),

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<sup>23</sup> Jiangsu Provincial Education Examination Authority. Notice on Implementing Separate Entrance Reform of Higher Vocational Schools in 2015 of Department of Education of Jiangsu Province[EB/OL]. [http://www.jseea.cn/contents/channel\\_26/2014/12/1412311159766.html](http://www.jseea.cn/contents/channel_26/2014/12/1412311159766.html)□2014-12-31.

<sup>24</sup> Shanghai Municipal People's Government. Implementation Plan on Promoting the Enrollment System Reform of Higher School[EB/OL]. <http://www.shmec.gov.cn/html/xxgk/201409/420032014012.php>, 2014-09-18:3.

99 professional categories( 专业类 ), 748 majors( 专业 )and 291 relevant jobs( 职业 ).<sup>25</sup> From the comparison table of new and former specialties, it's not difficult to find that the change of majors reflects the development of economics. Some new majors appear because of the needs of economic transition. The “pollution remediation and ecological engineering” major as well as “resource utilization and management” major caters to needs of sustainable economic development. These majors are aimed at increasing resource usage efficiency while decreasing pollution emissions with the application of new science and technology. At the same time, some majors disappear because they are not fit in with the process of social economy. The “forest logging engineering” major and “forest by-product processing” major are cancelled in that the forest resource is a kind of half-regenerate source which should be well protected and alternative resources are exploited to meet the needs of industrial production. In addition to higher vocational schools, secondary vocational schools are provided with the specialty category “Teaching Standard of Secondary Vocational School”( 中等职业学校专业教学标准 ) in 2014. In this category, there are 14 professional categories( 专业类 ) and 95 majors( 专业 ) related to economics, medicine, information technology, manufacturing, agriculture and so forth.<sup>26</sup> It is convenient for secondary vocational schools to adjust specialty structure and design teaching activities with the reference of this specialty category.

The excellent teacher cultivation program has started since 2014 to train more double-qualified teachers. Programs focusing on teachers of secondary vocational schools are held by technology colleges like Tianjin Vocational and Technology Normal University, Jilin Engineering Normal University, Guangdong Technology Normal University and so on. Besides, some universities like Tongji University, Hubei Technology University take part in teacher training programs as well.<sup>27</sup> These programs focus on the theory and practice of how to cultivate high-qualified teachers in today's background. Moreover, vocational schools have made great effort to train double-qualified teachers, taking Ningbo Yinzhou Vocational School as an example. A special teacher training mode called “One Base, Two Trains and Five Entrances”

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<sup>25</sup> Ministry of Education of the People's Republic of China. Revision Note of Category of Higher Vocational Education Specialty of General Higher School 2015[EB/OL]. [http://www.moe.edu.cn/srcsite/A07/moe\\_953/moe\\_722/201511/t20151105\\_217877.html](http://www.moe.edu.cn/srcsite/A07/moe_953/moe_722/201511/t20151105_217877.html), 2015-10-28:1.

<sup>26</sup> General Office of the Ministry of Education of the People's Republic of China. Teaching Standard of Secondary Vocational School[EB/OL]. [http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe\\_721/201405/169178.html](http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/moe_721/201405/169178.html), 2014-04-30.

<sup>27</sup> Teacher Department of Ministry of Education of the People's Republic of China. Selection Result of Excellent Teacher Cultivation Program[EB/OL]. [http://www.moe.gov.cn/s78/A10/A10\\_gggs/s8471/201411/t20141121\\_181015.html](http://www.moe.gov.cn/s78/A10/A10_gggs/s8471/201411/t20141121_181015.html), 2014-11-20:1.

is created by this vocational school. “One Base” program aims to increase teachers’ knowledge accumulation as well as strengthen teachers’ teaching and research ability through training. “Two Trains” offers new teachers induction training while backbone teachers promoting training. As for “Five Entrances”, it is consisted of: teachers joining industry associations to know the industrial needs, teachers taking part in professional skills competition to strengthen teaching abilities, teachers going into enterprises to make practice, teachers entering universities to have further studies and experts coming to schools to pass on new theories. Through this unique model, teachers’ capacity is enhanced and 85% of teachers have developed into double-qualified teachers.<sup>28</sup>

### 3.3 Cases of improving Management and Evaluation Measures

Educational management and evaluation measures contain a series of specific methods. In the “Action Plan on Improving Management of Vocational School (2015-2018)” (职业院校管理水平提升行动计划), it points out some main references including teaching quality management on the process of educational management improving. And the inner quality diagnosis institution is what higher vocational schools have done on teaching quality management. For educational evaluation, the implementation cases of annual quality report demonstrate vocational schools’ efforts.

In order to improve teaching quality management of vocational schools, the Ministry of Education publishes “Notice on Establishing Diagnosis and Improvement Institution in Vocational Schools of the General Office of the Ministry of Education”. (教育部办公厅关于建立职业院校教学工作诊断与改进制度的通知) Based on school philosophy and educational objective, vocational schools are asked to find and solve problems by themselves in these areas like specialty structure, teaching troops, curriculum system, teaching activity, management institution, school-enterprise cooperation and so on.<sup>29</sup> Then another document called “Instruction on Diagnosis and Improvement of Inner Quality Assurance System in Higher Vocational Schools” (高等职业院校内部质量保证体系诊断与改进指导方案) is issued so as to guide the

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<sup>28</sup> Chinese Vocational and Technical Education. Recreation Forging Upgraded Vocational School[EB/OL]. <http://www.cnki.com.cn/Article/CJFDTotal-ZONE201404014.htm>, 2014(04):29.

<sup>29</sup> General Office of the Ministry of Education of the People’s Republic of China. Notice on Establishing Diagnosis and Improvement Institution in Vocational Schools of the General Office of the Ministry of Education[EB/OL]. [http://www.moe.edu.cn/srcsite/A07/moe\\_737/s3876/201507/t20150707\\_192813.html](http://www.moe.edu.cn/srcsite/A07/moe_737/s3876/201507/t20150707_192813.html), 2015-06-23:1.

establishing of diagnosis and improvement institution in higher vocational schools. With the aid of this instruction, higher vocational schools are able to operate the diagnosis and improvement institution step by step. Independently established higher vocational schools should finish the diagnosis of quality assurance system at least every 3 years while newly established schools implement inner diagnosis according to regulations made by educational administrative department. Higher vocational schools make diagnosis on the operating conditions of inner quality assurance system and add the diagnosis result into annual quality report. The diagnosis content includes: the philosophy, organization, staff, institution, implementation and information collection of quality assurance; construction and diagnosis of specialty; quality assurance of curriculum; construction and diagnosis of teaching staff; plan and diagnosis of cultivation program; quality assurance of inner and external environment; monitoring of emergence and results of quality assurance strategies.<sup>30</sup> These factors mentioned above have been dispersedly present in vocational schools' annual quality reports and would be more systematically exhibited.

The website "Higher Technical and Vocational Education in China" lists the annual quality reports of higher vocational schools since 2011. The number of vocational schools from 32 provinces and districts submitting annual quality reports increases year by year: from 236 in 2011, 585 in 2012, 1146 in 2014, 1277 in 2015 to 1549 (1276 vocational school and 273 enterprises) in 2016. The changing trend is showed in chart 1. Some enterprises taking part in vocational education and training submit annual quality report as well in 2016. Similarities and differences exist within and among provinces every year in the number of vocational schools submitting reports: the number of vocational schools submitting reports is increasing almost in every province; there are 84 vocational schools in Jiangsu province submit their reports while only 1 in Tibet in 2016. Besides, the content of vocational schools' annual quality report can be summarized as: general situation, students' development, educational reform, social service, policy support, challenges and attachment (score card, resource table, service table and performance table) For enterprises' annual quality report, it is made up of basic facts of enterprise and school, participating in school running, resource input, participating in teaching, benefits of school-enterprise cooperation, social service and assurance system.

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<sup>30</sup> Vocational & Adult Education Department of the Ministry of Education of the People's Republic of China. Instruction on Diagnosis and Improvement of Inner Quality Assurance System in Higher Vocational Schools[EB/OL]. [http://www.moe.edu.cn/s78/A07/A07\\_gggs/A07\\_sjhj/201512/t20151230\\_226483.html](http://www.moe.edu.cn/s78/A07/A07_gggs/A07_sjhj/201512/t20151230_226483.html), 2015-12-30:3-15.

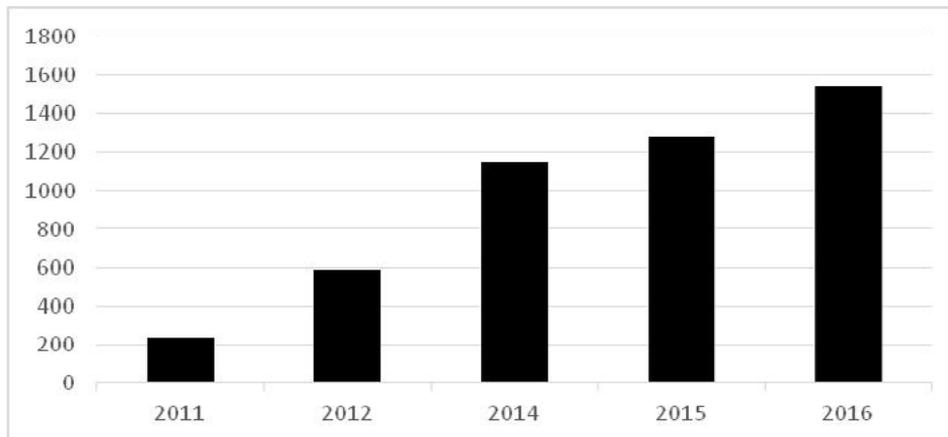


Chart 1. Quantity change of annual quality report

### 3.4 Cases of Completing External Guarantee Mechanism

To complete external guarantee mechanism, a lot of work have been done to strengthen the expenditure guarantee and increase the resource input.

Expenditure guarantee is a necessary material base for quality improving of vocational education and training. And the central government has tried hard to increase investment. In 2014, the total investment of vocational education has reached 342.4 billion, which represents a 42.2% increase over 2010, with the average growth rate per annum accounting to 10.1%. And from 2010 to 2014, the central expenditure for secondary vocational education increases 54.9 billion, risen by 40.6% with 9.7% per annum; the investment in higher vocational education increases 46.6 billion, risen by 44.4% with 10.5% per annum.<sup>31</sup>(教育规划纲要中期评估—职业教育评估报告) In order to support the training base establishing, the central government has invested a large amount of money since 2004. And the total investment has increased from 11,870 in 2004 to 140,000 in 2013.<sup>32</sup> In addition to central government, local governments also fulfill their duty to assure appropriation per student. By the end of 2014, 23 provinces and districts set the appropriation standard per student of higher and secondary vocational education. In 2013, within public finance budget per student

<sup>31</sup> Ministry of Education of the People's Republic of China. Mid-Stage Assessment of National Education Plan (2010-2020) -Appraisal Report of Vocational Education[EB/OL]. [http://moe.edu.cn/jyb\\_xwfb/xw\\_fbh/moe\\_2069/xwfbh\\_2015n/xwfb\\_151202/151202\\_sfcl/201512/t20151202\\_222\\_297.html](http://moe.edu.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2015n/xwfb_151202/151202_sfcl/201512/t20151202_222_297.html), 2015-12-02:3.

<sup>32</sup> Ministry of Education of the People's Republic of China. Construction Achievement of Training Base Supported by the Central Finance[EB/OL]. [http://www.moe.gov.cn/s78/A07/zcs\\_left/zcywlm\\_zhgg/s3060/s3062/201412/t20141222\\_182161.html](http://www.moe.gov.cn/s78/A07/zcs_left/zcywlm_zhgg/s3060/s3062/201412/t20141222_182161.html), 2014-12-22.

in secondary vocational schools, operation expenses for education reach 8,784.64, 16.1% over 2012; public expenses reach 3,578.25, 20.2% over 2012. And 40% of students in secondary vocational schools as well as over 25% of students in higher vocational schools are able to obtain fellowship. Besides, 91.5% of students from rural areas, poor families and students whose majors are related to agriculture in secondary vocational schools enjoy the tuition waiver.<sup>33</sup> More speculatively, secondary vocational schools in 9 provinces including Shanxi, Inner Mongolia, Jiangsu, Fujian, Guizhou, Qinghai, Chongqing, Ningbo, Xiamen have exempted tuition fee for all students. Special financial subsidies are used to pay the tuition fee for students and the subsidies range from 2,000 to 6,500 per student.<sup>34</sup>

The teaching resource library has been built in many vocational schools to increase and share resources. The Ministry of Education publishes a program list of teaching resource library applied by vocational schools almost every year since 2010. In 2010, apply to build 11 teaching resource libraries held by 12 vocational schools have been accepted by the Ministry of Education and Finance.<sup>35</sup> The specialties involved include numerical control technology, architectural engineering, accounting and so on. And only 2 vocational schools build 1 teaching resource library together; in 2011, 8 teaching resource libraries built by 8 vocational schools are accepted.<sup>36</sup> Specialties cover software technology, electronic business, medical preparation and so forth; in

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<sup>33</sup> Ministry of Education of the People's Republic of China. Mid-Stage Assessment of National Education Plan (2010-2020) -Appraisal Report of Vocational Education[EB/OL]. [http://moe.edu.cn/jyb\\_xwfb/xw\\_fbh/moe\\_2069/xwfbh\\_2015n/xwfb\\_151202/151202\\_sfcl/201512/t20151202\\_222\\_297.html](http://moe.edu.cn/jyb_xwfb/xw_fbh/moe_2069/xwfbh_2015n/xwfb_151202/151202_sfcl/201512/t20151202_222_297.html), 2015-12-02:4.

<sup>34</sup> People's Daily. 9 Secondary Vocational Schools Exempt Tuition Fee[EB/OL]. [http://www.moe.gov.cn/jyb\\_xwfb/xw\\_fbh/moe\\_2069/s7135/s7174/s7177/201302/t20130221\\_147736.html](http://www.moe.gov.cn/jyb_xwfb/xw_fbh/moe_2069/s7135/s7174/s7177/201302/t20130221_147736.html), 2013-02-21:1.

<sup>35</sup> Vocational &Adult Education Department of the Ministry of Education of the People's Republic of China. Acceptance Result of 2010 Teaching Resource Library Programs of Higher Vocational Education[EB/OL]. [http://www.moe.gov.cn/s78/A07/A07\\_gggs/A07\\_sjhj/201301/t20130131\\_147396.html](http://www.moe.gov.cn/s78/A07/A07_gggs/A07_sjhj/201301/t20130131_147396.html), 2013-01-30.

<sup>36</sup> Vocational &Adult Education Department of the Ministry of Education of the People's Republic of China. Acceptance Result of 2011 Teaching Resource Library Programs of Higher Vocational Education[EB/OL]. [http://www.moe.gov.cn/s78/A07/A07\\_gggs/A07\\_sjhj/201310/t20131011\\_158260.html](http://www.moe.gov.cn/s78/A07/A07_gggs/A07_sjhj/201310/t20131011_158260.html), 2013-10-09.

<sup>37</sup> Ministry of Education of the People's Republic of China. Notice on Confirming Construction Program of 2014 Teaching Resource Library of Vocational Education of Ministry of Education[EB/OL].

2014, there are 14 teaching resources libraries held by 16 vocational schools and 1 teaching guide committee.<sup>37</sup> ( 教育部关于确定职业教育专业教学资源库 2014 年度立项建设项目的通知 ) These teaching resource libraries cover the specialties like horticulture, international trade, food quality testing, digital media, electric automation and so on. Vocational schools like Liaoning Agriculture Vocational School and Jiangsu Agriculture and Forest Vocational School cooperate to build the horticulture teaching resource library. The footwear design teaching resource library is build by Wenzhou Vocational School with the help of Textiles and Garments Teaching Guide Committee. Other vocational schools such as Zibo Vocational School, Wuxi Vocational School choose to build the teaching resource library by themselves; then in 2015, 35 vocational schools and 2 teaching guide committees apply to build 22 teaching resource libraries.<sup>38</sup> ( 教育部关于确定职业教育专业教学资源库 2015 年度立项建设项目及奖励项目的通知 ) Involving specialties contain energy, communication technology, forestry, costume design, special education, legal secretary and so on. Compared with 2014, more vocational schools and teaching guide committees collaborate to build teaching resource libraries. For example, Shenzhen Vocational School, Nanjing Information Vocational School and Shijiazhuang Post Vocational school build the information technology teaching resource library together; Shandong Technology Vocational School, Hangzhou Vocational School and Textile and Garments Teaching Guide Committee co-establish the costume design teaching resource library. It's not hard to find that more and more vocational schools apply to build teaching resource library from 2010 to 2015. Besides, the number of interschool cooperation programs increase year by year.

#### 4. Outcomes

Educational resources have been largely enriched by means of increasing educational investment, building teaching resource library and developing school-

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<sup>38</sup> [http://www.moe.gov.cn/srcsite/A07/s7055/201407/t20140702\\_171249.html](http://www.moe.gov.cn/srcsite/A07/s7055/201407/t20140702_171249.html), 2014-06-26.

Ministry of Education of the People's Republic of China. Notice on Confirming Construction Program and Bonus Program of 2015 Teaching Resource Library of Vocational Education of Ministry of Education[EB/OL]. [http://www.moe.gov.cn/srcsite/A07/moe\\_737/s3877/201507/t20150727\\_195705.html](http://www.moe.gov.cn/srcsite/A07/moe_737/s3877/201507/t20150727_195705.html), 2015-06-30.

<sup>39</sup> Ministry of Education of the People's Republic of China. 2012 China Education Overview[EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s5990/201111/126550.html>, 2013-10-23:7. Ministry of Education of the People's Republic of China. 2014 China Education Overview[EB/OL]. [http://www.moe.gov.cn/jyb\\_sjzl/s5990/201511/t20151125\\_220958.html](http://www.moe.gov.cn/jyb_sjzl/s5990/201511/t20151125_220958.html), 2015-11-25:7.

enterprise cooperation. During 2011 to 2014, educational instruments per student increase from 2596 to 4661 in secondary vocational schools while from 6634 to 7897 in higher vocational schools.<sup>39</sup> By 2015, there are 60 teaching resource libraries for different specialties including hospitality management, electrical automation, biotechnology, preschool education, accountancy, embroider, crop production and so on. Every teaching resource library contains online courses, professional research, virtual training, material database, enterprise cases and other resources related to teaching, training and learning. All these resources are listed in the website “The Vocational Education Teaching Resource Library Column” and open to everyone. Hence, it is possible for any person to learn anywhere at anytime with the access to internet.

Teaching staff of vocational schools have been optimized. In recent years, some favorable changes happen to teachers of vocational schools in the aspect of quantity and quality. According to the report “China Education Overview” ( 中国教育概况 ) issued by the Ministry of Education, the student-teacher ratio of secondary vocational schools decreases from 25.8:1 in 2011, 24.7:1 in 2012, 23.0:1 in 2013 to 21.3:1 in 2014; the student-teacher ratio of higher vocational schools shows a descending trend basically, from 17.3:1 in 2011, 17.2:1 in 2012, 17.1:1 in 2013 to 17.6:1 in 2014. The decrease of student-teacher ratio means that students have more chance to enjoy teaching resources. Besides, the proportion of double-qualified teachers in secondary vocational schools increases year by year: from 23.7% in 2011 to 27.6% in 2014. In higher vocational schools, teachers with graduate degrees increase from 35.4% in 2011 to 42.3% in 2014; teachers with senior professional titles present a rising tendency from 28.9% in 2011 to 29.4% in 2014.<sup>40</sup>

Students’ employability has been enhanced with the efforts of governments, schools and enterprises. The central government appropriates funds for training base building. And a large number of vocational schools have built training base within or out of school to equip students with practical skills. Besides, enterprises develop order-type cultivation programs so as to help students learn from real works. From the annual quality report of higher vocational schools, it’s not difficult to find that more students are able to find jobs or become self-employed and that employers are satisfied with students from vocational schools. In general, data like monthly income, entrepreneurship rate and employer satisfaction rate recorded in the score card are all

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<sup>40</sup> Ministry of Education of the People’s Republic of China. 2012 China Education Overview[EB/OL]. <http://www.moe.edu.cn/publicfiles/business/htmlfiles/moe/s5990/201111/126550.html>, 2013-10-23:5-7.

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rising year by year.

The quality assurance system of vocational education and training has been promoted in consideration of three factors. First is the establishing of quality criteria system. The Ministry of Education has formulated and issued teaching criteria, specialty categories and specialty management measures of secondary and higher vocational schools. These documents are used to regulate the conditions and procedures of specialty setting as well as standardize the specialty teaching process. Second is the implementing of internal quality management institutions. The institution of vocational schools' annual quality report has been normalized while the inner diagnosis and improvement institution has taken initial shape. Last is the completing of external quality mechanism mechanism. The financial investment in vocational education and training reveals a general trend of increase and more excellent resources are open to people through network.

# **Talent Development through Assessment of Technical Education in Malaysian Secondary Schools**

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## **ABSTRACT**

*In the era of the industrial revolution 4.0, new shifts in the talent development through assessment of technical education programs were innovations towards universal education sustainability. Hence, this study was conducted to evaluate Malaysian technical education. A CIPP model was used as a conceptual framework for the study. Research design used in this study was programs evaluation. Stratified random sampling was used to select 335 respondents from national secondary schools in Peninsular Malaysia consisted of 159 administrators and 176 teachers. Questionnaires, interview protocols and observation checklists were used as instruments in this study. Descriptive and inferential statistics were used to analyze the data. The empirical data of the study found that Innovative technical education assessments should take into account is the knowledge and skills of teachers, staff training and role of administrators.*

**KEYWORDS:** Technical education, Talent development, CIPP model, national schools, Malaysia

## 1.0 INTRODUCTION

The United Nations Educational, Scientific and Cultural Organization (UNESCO) have outlined various educational transformation initiatives through cooperation among member countries. The Millennium Development Goals (MDG) enacted in 2000 is directly related to the technical and vocational education system. Several MDG strategies have been implemented to improve all aspects of the quality of the educational environment including highlighting technical and vocational education through content improvement and educational methods, such as expanding student-centered learning methods, improving materials and learning technology through curriculum reform, teacher training, materials development, and monitoring and assessment of learning achievement (UNESCO, 2002; UN, 2010). However, MDG has less emphasis on improving knowledge, skills, values and attitudes. Thus, UNESCO has introduced the Sustainable Development Goals (SDG) 2015-2030, to ensure the development of quality and equitable education and to promote lifelong learning for all (UN, 2015; UNESCO, 2016). The SDG also emphasized that the main goal of technical and vocational education in the 2030 agenda, is to achieve sustainable development. The Bonn Declaration (2004) states that Sustainable Development for Technical and Vocational Education (TVE) must equip an employee with the knowledge, competence, skills, values and attitudes to produce a responsible and productive citizen who is always appreciative of the success of the work performed. Those initiatives would create a sustainable and innovative society.

During the 10th Malaysian Plan period, (2011-2015), several efforts to modernize and expand access to quality TVETs to meet industry needs have been implemented in Malaysia: (i) improving TVET quality, (ii) strengthening TVET curriculum, (iii) enhancing relationships with industry and professional bodies, (iv) increasing student participation in vocational streams in technical secondary schools, as well as broadening and restructuring of Malaysian Plan of Vocational (MPV). This effort has contributed to the increase in Malaysian Certificate of Education (SPM) graduates joining TVET, up 36% in 2013 compared to 25% in 2010 (EPU, 2015). The TVET transformation program was launched in 2012, emphasizing, among others, to increase student participation in the TVET field in Malaysia (10% to 25%), compared to student involvement in the TVET field in European countries such as France, Germany, Finland and Austria (50% to 80%) (KPM, 2013). In support of TVET's policies and transformation plans, the Technical and Vocational Education Division – Malaysian Ministry of Education (BPTV - KPM) has outlined three key roles: (i) ensuring the implementation and progress of technical and vocational education at the local school level, (ii) providing opportunities for students who are likely to technical and vocational education and thus reduce student dropout problems, and (iii) provide equal opportunities for technical and vocational education to all students (Asnul et al., 2013).

The Malaysian Education Development Plan (PPPM) 2015-2025, was formulated to transform the national education system. To ensure the quality of international education, it is important that Malaysia compares its education system with international benchmarks to keep it in line with international education development. The sustainability of PPPM's is driven by the implementation of the Eleventh Malaysia Plan (2016) [2016-2020], the Economic Planning Unit (EPU), which has formulated nine strategic papers, transforming education and technical and vocational training to meet industry demand and contribute to economic growth, in line with globalization, the knowledge-based economy, the technological advances and mobility of the global workforce where the focus is on transforming the TVET delivery system to increase TVET's attractiveness as an educational path of choice because according to Ramlee (2013), to advance Malaysia towards industrialized countries, human capital investment is critical. The knowledge-based economy (k-economy) requires a lot of creative and innovative workers.

Teacher's knowledge and skills are a challenge in teaching AK (Fundamental of Sustainability), GKT (Technical Communication Graphic) and RC (Invention) (Radin, 2008; Kelly, 2009; Yusuff & Soyemi, 2012; UNESCO-UNIVOC, 2013). Furthermore, the study by Ruhizan et al. (2012) find that students often face difficulty in solving problems due to poor visualization due to inappropriate student selection mechanisms based on their academic achievement at Level Three Assessment. School administrators do not understand technical subjects, weaknesses of TVET leadership in designing, organizing and implementing effective strategies towards generating skilled and innovative human capital (Abu Bakar, 1991; Irdyanti, 2016). Previous studies have also found that AK (Asas Kelestarian), GKT (Grafik Komunikasi Teknikal) and RC (Reka Cipta) subject teachers are still less exposed to proper training and skills, teachers' readiness to teach subjects is low, teacher ICT skills are weak, as staff training is poorly implemented (Azizi & Roslan, 2000; Rashidah, 2001, Jamil; 2008, Nordin, 2011; Asnul et al., 2013).

## **2.0 LITERATURE REVIEWS**

The effectiveness and quality of technical education depend not only on resource factors such as equipment, funds and materials, but also on the skills of the coach in managing the program (Finch & Crunkilton, 1999; Asnul et al., 2013). Teacher skills are critical factors in determining the quality of educational experiences provided to students and the core of curriculum development is teacher development as a key factor for centuries (Stenhouse, 1975; Kelly, 2009; Darling-Hammond, 2010). Teacher effectiveness in delivering curriculum content is also one of the most frequently asked issues as teachers are the catalyst for academic success. Studies

conducted by Hashim (2009) and Luck and Peng (2010) show that there are significant differences in the teaching and learning process between the thinking of experienced teachers and inexperienced teachers in terms of the effectiveness of science and mathematics teaching in English. This finding indicates the need for a good level of knowledge and skills for educators in the field of education as teacher skills also influence a teacher's thinking. High skills and knowledge are required of a teacher in his or her field, where students have given high scores to teachers who have attended courses related to their field of study (Thompson, 2003; Smith, 2004; Fullan, 2014).

The role of teachers has been found to be less effective in and out of the classroom in the face of rapid changes in the national education system. Therefore, talent development through assessment to improve teacher effectiveness, efficiency and professionalism is important. Teacher training programs need to be a part of the school culture to enhance teacher professionalism. Meanwhile, teachers' knowledge in their field has been seen as important and motivates their students to pursue their learning (Mardevan, 1991; Garmston, 1991; Oakland, 1996; Ann Lewis, 2007; Asnul et al., 2013). The study of Azizi (2000), Husin (2006) and Nordin (2011) suggested that a comprehensive training program for teachers should be held to enhance teacher competence in terms of skills, knowledge and self-confidence. Staff training needs to be coordinated by providing a systematic content that meets the needs of teachers (Mohammed Sani, 1992; Alias et al., 2011). Staff training can promote the talent development, improvement and efficiency of teachers, enhance the potential of teachers to improve school learning and enhance the effectiveness of the school as a teacher-based organization of constructive ability to achieve school goals. The attitude of always wanting to improve knowledge is one of the characteristics of effective teachers. By attending in-service courses, they can develop their knowledge and skills in education (Mohammed Sani, 1998; Ramlee, 1999; Noor Akmar, 2006; Nordin, 2011; Jamil, 2012).

Administration role is important to determine teacher competency. Among the challenges to be addressed as outlined in the Malaysian Education Development Plan (PPPM) are the challenges associated with talent development to providing quality governance to achieve the objectives of ensuring effective leadership and management of schools (KPM, 2013). Administrators should have their own creativity and innovation because Namara (1998) explains that creativity and innovation are key factor to the success and effectiveness of the planning and implementation of a program (Namara, 1998; Asnul et al., 2013). Making a program decision, planners need to pay attention to each member, administrators also need to be creative in designing the learning program. Meanwhile, administrators need to have personalities and identities, creative and innovative in planning organizational progress and development. The governing body has the supportive role of providing the right environment for implementation, the role of the administrator as a prerequisite for the success of the program (Ahmad Atori, 1990; Abu Bakar, 1991; Owen; 1995; Keller,

2005; Irdayanti et al., 2016).

In addition, administrators need to have close and special relationships with their subordinates in order to adhere to the rules set by the organization. The administrator of an organization is responsible for developing the potential and creativity of the individual within the organization to meet their personal needs and to compete for continuous and challenging environmental change. Developing creativity cannot be overstated, but creativity is an important part of daily life. The creative potential that a person possesses is a skill that needs to be nurtured and developed so that creativity can be utilized by one and others. A person who embarks on a creative endeavour has actually moved from a stereotype to a more successful and enjoyable situation. The school environment requires creativity to plan, discover, research, enhance the learning and teaching climate and create attractive situations in schools (Dalton, 1990; Hisham, 1991; Luck Peng, 2010). Principals roles are important as they are expected to determine the direction of the school, provide guidance, explain roles and work procedures, motivate and inspire teachers and students while providing resources and support as well as evaluating and taking follow-up and make the necessary changes to the organization (Pilgrims, 1993; Bush, 2003; Bush & Middlewood, 2005; Sergiovanni, 2001; Ubben, Hughes & Noris (in Nik Azis, 2008); Irdayanti et al., 2016). Among the important role of administrator is to organize talent development such as systematic staff training in action.

Staff training is a continuous process organized by the school with specific goals and objectives to enhance teachers' skills and abilities as teachers' skills and abilities have a significant impact on student achievement and learning. In addition, teachers' skills and abilities are needed to meet the demands of economic, social or government policy. Teachers who have formal courses have been found to be able to apply a variety of teaching strategies to their students' learning needs and styles (Aitken, 2000; Nik Azis, 2008; Kang et al., 2010; Fullan, 2014). Meanwhile, Paris and Winograd (1995) and Ruhizan et al. (2012) in their study found that teachers and schools failed to help students acquire the knowledge, skills and exposure they needed outside of school and at work. The challenge that teachers face is to make learning in the school more meaningful, useful and contextual in real life and work environment so that high school students have the problem solving skills. The level of training that will be provided by the parties is determined by four main factors. The first is the extent to which the knowledge, skills, attitudes and techniques to be used are not yet available to the teachers and in what areas these aspects are still lacking. Both relate to the ability and willingness of the parties to learn, gain knowledge and use new ways and thus turn them into new practices. Third is the logistics ability of the training in performing this role. Fourth is a factor that is closely related to the logistics of using a university-based accreditation model. Whereas, to develop successful students it is mostly depends on good teachers and schools. Therefore, talent development to upgrade teachers' skills and quality as well as school or educational institutions are

worthwhile (Frank & Miles, 2008; Billet 2011b; Alias et al., 2011).

As a teacher, the individual should have knowledge of various aspects. According to Ee Ah Meng (2003) and Mok Song Sang (2010), teachers should master the subject to be taught, know the subject in the syllabus and know all the new discoveries in their field. A good teacher will discover into his teaching at all times. In this study, the researchers wanted to see how well the teachers' knowledge of the content of the subject was taught and the pedagogical skills as well as the technical skills of the teachers in using the equipment in the workshop to convey the content of the subject. Pedagogical skills or teaching skills are interpreted as steps in delivering content based on specific theories, approaches, methods, techniques and strategies (Kamarudin, 1986; Fullan, 2014). While all of these aspects are important, aspects that teachers often emphasize are aspects of teaching methods and techniques. In the implementation of technical education, talent development of technical knowledge and technical skills are essential to ensure that teachers are able to present the content effectively. This is because in technical and vocational education teachers also serve as coordinators who should have the technical education, professional education, and work experience needed to succeed as technical and career education teachers (Husted et al., 2003; Billet, 2011b, Asnul et al. , 2013).

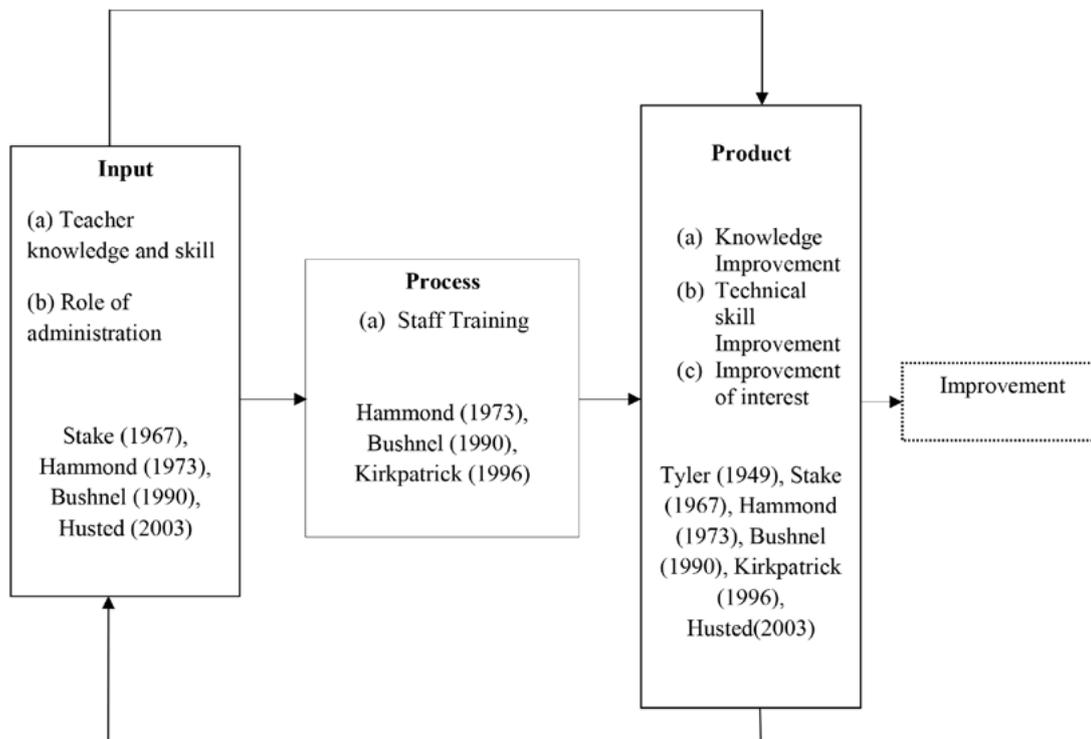
### **3.0 STATEMENT OF THE PROBLEM**

In the era of globalization and rapid technological developments, based on economic changes. TVET innovation and talent development has become an agenda in most developing countries. Issues related to quality of education, lifelong learning, entrepreneurial skills, infrastructure as well as sustainable development are the main focus of the transformation and innovation in technical education (UNESCO, 2015; UNESCO, 2016). In Malaysia generally, the achievement of technical stream students less encourage and the decline in student enrolment has been a factor in the success of the TVET transformation. Malaysian Examination Board (LPM) data for AK, GKT and RC subjects indicate that students' achievement was weak. Based on previous empirical studies on implementation of technical education in Malaysian secondary schools, the key issues are limited teacher knowledge and skills, poor administrative role and lack of staff training (Azizi & Roslan 2000; Rashidah, 2001; Ahmad Zairi. 2002; Jamil, 2008; Nordin, 2011; Ruhizan et al., 2012; Azaman, 2012; Asnul et al., 2013; Irdayanti et al., 2016; Sadrina & Ramlee, 2019; Mohd Tafizam et al., 2020). Therefore, it's important for Malaysia to improve their TVET system in line with the talent development through assessment of technical education 4.0.

## 4.0 METHODOLOGY

Research design used in this study was programme evaluation study using part of the Context, Input, Process and Product (CIPP) model by Stufflebeam et al. (1971). The sample size of the study was based on Krejcie & Morgan's sample size table, in which 335 survey respondents were randomly selected based on zones. A total of 12 respondents at the Secondary School were interviewed. Stratified random sampling was used to select 335 respondents from national secondary schools in Peninsular Malaysia consisted of 159 administrators and 176 teachers. Because the respondents in this study are numerous but require minimal interaction with the respondents, the questionnaire is suitable for use. Although the data obtained through the survey in this study were numerical data and were analysed according to descriptive statistical procedures and inferences, some of these numerical data require more in-depth explanations through interviews from a small number of respondents. Further observations using the checklists were also conducted to see the general teaching and learning process through school visits.

Questionnaires, interview protocols and observation checklists were used as instruments in this study. Cronbach Alpha reliability index for the three sets of questionnaires were between 0.77 to 0.93. Descriptive and inferential statistics were used to analyse the data. Figure 1 shows the conceptual framework of the study based on several models selected to construct the appropriate input dimension construct



including Stake (1967), Hammond (1973), Bushnel (1990) and Husted (2003). The dimensions of the process are Hammond (1973), Bushnel (1990) and Kirkpatrick (1996). Furthermore, product dimensions are shaped by the models of Tyler (1949), Stake (1967), Hammond (1973), Bushnel (1990), Kirkpatrics (1996), Husted (2003).

Justification using the CIPP Model Stufflebeam et al., (1971) in this study is to obtain information through a comprehensive approach to providing information to decision makers. Improvements in the quality of the education system must be made to meet the challenges of the changing world with the application of Science, Technology, Engineering and Mathematics (STEM). In order to realize GTP and ETP, needs for skilled workers and k-workers by the year 2020 need to be increased (Posavac, 2015; JPM, 2015). Based on the special features of the CIPP Model such as overall improvement orientation, quantitative and qualitative data collection methods and their flexible nature, it is well suited to the evaluation studies of AK, GKT and RC subjects. Based on these justifications, the researchers chose to use the CIPP Model Stufflebeam et al. (1971), focusing only on input dimensions (teachers' knowledge and skills and role of administrators), process dimensions (staff training process implementation) and product dimensions (subject products). The contextual dimension was dropped because the study did not focus on needs analysis, assuming that needs analysis was conducted before the subject was launched in 1995.

## **5.0 FINDINGS**

### **5.1 Teacher Knowledge and Skill**

The mean score analysis in Table 1 shows administrators ( $M = 4.03$ ,  $S.D. = 0.41$ ) and teachers ( $M = 4.02$ ,  $S.D. = 0.46$ ) believe that teachers have extensive knowledge and practice effective teaching techniques. This shows that administrators and teachers agree on teachers' knowledge and skills, but at different mean scores.

Table 1: Mean Scores Teacher Knowledge and Skill among Administrators and Teachers

No.	Item	Administrators (n=159)		Teachers (n=176)	
		Mean	S.D.	Mean	S.D.
<b>Teacher Knowledge and Skills</b>		<b>4.03</b>	<b>0.41</b>	<b>4.02</b>	<b>0.46</b>
B1.1	Teachers have a wealth of knowledge about the subject matter.	4.28	0.54	3.90	0.69
B1.2	Teachers use a variety of teaching techniques according to the title.	4.19	0.53	4.09	0.76
B1.3	The teacher is able to answer all the questions that the student poses well.	4.15	0.62	3.99	0.79
B1.4	Teachers master the content of textbooks in delivering lessons.	4.19	0.60	4.01	0.80
B1.5	The teacher explains each title in detail.	4.24	0.60	3.97	0.69
B1.6	Teachers use different teaching approaches based on student achievement levels.	4.03	0.59	3.98	0.54
B1.7	Teachers provide examples to enhance student understanding.	4.25	0.49	4.33	0.57
B1.8	Teachers often give students encouragement.	4.28	0.56	4.47	0.88
B1.9	Teachers are able to use the workshop equipment well.	4.25	0.62	4.04	0.58
B1.10	The teacher is able to repair all the damaged equipment.	3.73	0.92	3.41	0.76
B1.11	Teachers receive specialized training from recognized institutions for this subject.	4.23	0.74	3.61	0.76
B1.12	Teachers have a generally recognized level of skill.	4.08	0.69	3.68	0.55

In detail among administrators and teachers on items B1.1 to item B1.8 it is agreed that teachers have excellent knowledge of the subject matter and pedagogy. However, administrators and teachers also believe that teachers have good skills, but are inferior to the knowledge they have (items B1.9 to B1.12). For item B1.10, it appears that administrators (M = 3.73, S.D. = 0.92) believe that teachers are

able to maintain workshops equipment, but teachers ( $M = 3.41$ ,  $S.D. = 0.76$ ) also believe in lower mean scores. Similarly, for item B1.1, administrators were more agreeable ( $M = 4.23$ ,  $S.D. = 0.74$ ), than teachers themselves ( $M = 3.61$ ,  $S.D. = 0.76$ ) on the training received by teachers from recognized training institutions. The same perception was given by administrators who were more agreeable ( $M = 4.08$ ,  $S.D. = 0.69$ ) than teachers themselves ( $M = 3.68$ ,  $S.D. = 0.55$ ) over the level of training that teachers received. This shows that teachers are less confident about their skills than administrators.

Interviews conducted with administrators (PT2AK) are also in line with the findings of the questionnaire, teachers with in-depth knowledge and skills. The administrator (PT2AK), on the other hand, insisted that the AK teacher at his school had a background in engineering, and was an optional teacher. Teachers also have ICT skills according to administrators (PT2AK), here are their opinions:

*In terms of knowledge, it is true that my teacher is someone who has a deep knowledge of this subject, ok, and she, too, is a skilled teacher in this subject (PT2AK).*

*I see that the teachers who teach this, indeed, the GKT teachers who have a background in engineering, as well as the RC, are the teachers with the knowledge and skills. He is experienced because he has been given the task of teaching both subjects; he is an optional teacher ... (PT1RC).*

*When I observe the teacher, but not this year, it was the teacher's use of IT facilities in their teaching... (PT2AK).*

## 5.2 Role of Administrators

Table 2 shows, administrators ( $M = 3.66$ ,  $S.D. = 0.44$ ), and teachers ( $M = 3.86$ ,  $S.D. = 0.51$ ) agreed that administrators played an effective role, but mean scores among teachers were higher than administrators.

Table 2: Mean Scores Role of Administrators among Administrators and Teachers

Variable	Administrators (n=159)			Teachers (n=176)		
	Mean	S.D.	Interpretation of Mean	Mean	S.D.	Interpretation of Mean
Role of Administrators	3.66	0.44	Agree	3.86	0.51	Agree

In detail among administrators and teachers of item B2.1, GKT administrators and teachers ( $M = 3.72$ ,  $S.D. = 0.84$ ) and RC ( $M = 3.78$ ,  $S.D. = 0.98$ ) agreed, respectively, AK administrators and teachers ( $M = 3.33$ ,  $S.D. = 0.93$ ) is not sure whether the relationship between school administrators and subject teachers is better. This indicates that the relationship between school administrators and teachers of GKT and RC is better than the relationship between AK school administrators and teachers as shown in Table 3. While mean scores were found among administrators and teachers for item B2.2, indicating that administrators and teachers of GKT subjects were not sure ( $M = 3.39$ ,  $S.D. = 0.87$ ), otherwise administrators and teachers of AK subjects were agree ( $M = 3.43$ ,  $S.D. = 0.89$ ), as well as among administrators and teachers for RC subjects, it was agree ( $M = 3.72$ ,  $S.D. = 0.87$ ) that the relationship between school administrators and students was good. This indicates that the relationship between school administrators and students of RC subjects is better than AK subject, while the relationship between school administrators for AK subjects is better than GKT subjects.

Furthermore, administrators and teachers for GKT subjects ( $M = 3.72$ ,  $S.D. = 0.86$ ), and RC ( $M = 3.58$ ,  $S.D. = 1.04$ ) believe administrators are committed to ensuring that these subjects work well, while administrators and teachers for AK subjects ( $M = 3.24$ ,  $S.D. = 0.99$ ) were not sure whether the administrators had shown a high commitment to keeping the subject well (B2.3). This indicates that school administration commitment for GKT subjects is better than RC and AK administrator commitment. For item B2.8, GKT administrators and teachers ( $M = 4.07$ ,  $S.D. = 0.69$ ), and AK ( $M = 4.00$ ,  $S.D. = 0.78$ ) believed that RC administrators and teachers were highly confident ( $M = 4.21$ ,  $S.D. = 0.61$ ), that the administrator ensures that the financial provisions are used wisely. This shows that RC administrators emphasize more on aspects of money management compare to GKT and AK administrators.

Table 3: Mean Scores Role of Administrators by Subject among Administrators and Teachers

No.	Item	GKT (n=127)		AK (n=125)		RC (n=83)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
2.1	I have a great relationship with this subject teacher.	3.72	0.84	3.33	0.93	3.78	0.98
2.2	I have a great relationship with students who take this subject.	3.39	0.87	3.43	0.89	3.72	0.87

2.3	I am committed to ensuring that this subject works well in school.	3.72	0.86	3.24	0.99	3.58	1.04
2.4	I often help solve any problems encountered in this subject.	3.87	0.81	3.40	0.78	3.59	0.88
2.5	I am constantly monitoring the progress of this subject from time to time.	3.97	0.73	3.76	0.69	3.95	0.68
2.6	I'm always on the lookout for teaching and learning processes.	3.88	0.68	3.80	0.58	3.99	0.61
2.7	I pay attention to student discipline in preparing for the course work.	4.04	0.69	3.83	0.58	3.99	0.55
2.8	I make sure the financial provisions are used wisely.	4.07	0.69	4.00	0.78	4.21	0.61
2.9	I encourage more students to take this course.	3.87	0.72	3.42	0.76	3.57	0.83
2.10	I encourage teachers to improve their academic level to empower their subjects.	4.03	0.64	3.90	0.63	4.09	0.62
<b>Average</b>		<b>3.86</b>	<b>0.47</b>	<b>3.61</b>	<b>0.47</b>	<b>3.85</b>	<b>0.49</b>

Interviews were conducted to support the findings of the questionnaire. The interview shows that there are still weaknesses in the aspects of the administrator's commitment to the subject, as one teacher (G2AK) said that administrators do not provide support and lack of understanding of the subject. The administrator (PT1GKT) admitted that he did not pay much attention to GKT subjects because of his low achievement. Meanwhile, GKT teachers (G1GKT) also argued that the administrators did not support the subject because of poor exam results, respondents said:

*The administrators here do not really care about this subject, there is no admin support, sometimes they do not really know what our kids are learning..(G2AK).*

*... Because the achievement of this GKT subject is not good, I do not care very much, rarely do I come to see students, talk ... (PT1GKT),*

*... But this administrator seems to be not supporting, as if he didn't see the result as it still fluctuates...*

*(G1GKT).*

### 5.3 Staff Training

Based on research questions to evaluate and determine the perceptions of administrators and teachers on staff training using questionnaire. The findings show that the analysis of mean scores and standard deviations as shown in Table 4, administrators (M = 3.64, S.P. = 0.56) found that staff training was adequate, whereas teachers were not sure (M = 3.38, S.P. = 0.65) whether staff training was adequate.

Table 4: Mean Scores Staff Training among Administrators and Teachers

Variable	Administrators (n=159)			Teachers (n=176)		
	Mean	S.D.	Interpretation of Mean	Mean	S.D.	Interpretation of Mean
Staff Training	3.64	0.56	Setuju	3.38	0.65	Not sure

Table 5 shows that overall administrators and teachers of Engineering Drawing were somewhat agreeable (M = 3.41, S.D. = 0.65), whereas administrators and teachers of AK (M = 3.35, S.D. = 0.71) and RC (M = 3.36, S.D. = 0.51) did not agree, whether the staff training is adequate. In details for items 3.1 to 3.5, perception of administrators and teachers on staff training are not sure with mean scores of M = 2.99 to M = 3.27. Item 3.1 had the lowest mean score (M = 2.99, S.D. = 1.06). That's means there are still aspects of staff training that need improvement. Furthermore, among administrators and teachers for items 3.6 to 3.9, it was agreed with the mean score of M = 3.81 to M = 4.10, with item 3.8 having the highest mean score (M = 4.10, S.D. = 0.65). Furthermore, administrators and teachers for all three subjects GKT (M = 3.07, S.D. = 1.02), AK (M = 2.88, S.D. = 1.10) and RC (M = 3.04, S.D. = 1.05) were not sure whether the The Ministry of Education regularly provides content related training (item 3.1). GKT administrators and teachers (M = 3.24, S.D. = 1.04), AK (M = 2.97, S.D. = 1.12) and RC (M = 3.13, S.D. = 1.10) were also not sure whether the State Department of Education regularly provided training on content lessons over time (item 3.2). This indicates that staff training organized by the Ministry of Education and the State Department of Education on aspects of teacher knowledge for all three subjects is still ineffective and needs improvement.

Further, internal training on pedagogy aspects that organized by school still can be improved, given that GKT administrators and teachers (M = 3.29, S.D. = 1.01), AK (M = 3.23, S.D. = 1.09) and RC (M = 3.33, S.D.= 1.04) are not sure whether the school has implemented internal training to enhance the professionalism of teachers

in implementing the teaching and learning process (item 3.3). Next, for item 3.4, GKT administrators and teachers (M = 3.12, S.D. = 1.09), AK (M = 2.98, S.D.= 1.16), and RC (M = 3.01, S.D. = 1.12) were not sure whether specific training was provided for improve teachers' skills in the use of tools and machines. This indicates that training to improve teachers' skills also needs to be re-evaluated. While administrators and teachers of GKT (M = 3.29, S.D.= 0.98), AK (M = 3.18, S.D. = 1.04) and RC (M = 3.16, S.D. = 1.04) are also not sure about the effectiveness of motivational training to improve self-confidence for teachers who teach this subject (item 3.5). This explains why motivational training also needs to be improved in the future.

Table 5: Mean Scores among Administrators and Teachers on Staff Training by Subject.

No.	Item	GKT		AK		RC	
		(n=127)		(n=125)		(n=83)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
3.1	The Ministry of Education regularly provides content related training.	3.07	1.02	2.88	1.10	3.04	1.05
3.2	The State Department of Education regularly provides content-based training over time.	3.24	1.04	2.97	1.12	3.13	1.10
3.3	Schools regularly provide internal training to enhance the professionalism of teachers in implementing the teaching and learning process.	3.29	1.01	3.23	1.09	3.33	1.04
3.4	Special training is provided to improve teachers' skills in using tools and machines.	3.12	1.09	2.98	1.16	3.01	1.12
3.5	Motivational training to increase self-confidence is also provided to this subject teacher.	3.29	0.98	3.18	1.04	3.16	1.04
3.6	Colleagues also regularly share their experiences in teaching and learning	3.85	0.86	3.73	0.89	3.84	0.80
3.7	Colleagues also regularly share their skills in teaching and learning.	3.93	0.74	3.84	0.79	3.84	0.82
3.8	Teachers regularly increase their knowledge and skills through reading.	4.12	0.65	4.08	0.70	4.06	0.55
3.9	Self-confidence in the subject is enhanced through the courses attended.	4.14	0.73	4.06	0.63	4.02	0.56
<b>Average</b>		<b>3.41</b>	<b>0.65</b>	<b>3.35</b>	<b>0.71</b>	<b>3.36</b>	<b>0.51</b>

Interviews with administrators are in line with the questionnaire on staff training where the training organized by the Ministry of Education was not enough, as stated by administrators (PT1RC):

*I see no training, because I record minutes, letters come in, I don't see any of it, even at the staff level we can't do it, because they just two teachers, what I want to do ... two teachers right (laughs), it should be the community at district level, his committee should organise it. Base on my observation, lately the training never done.(PT1RC).*

In agreement with the administrators, teachers (G1GKT) revealed that training in the form of professionalism has been delayed. As noted by the teachers (G1AK), the declining number of training is being organized by the Ministry of Education and the State Department of Education:

*Ok, back in 2007, when AKTK teachers were really fancy they went to teacher professional courses but since 2007, last time, then after that no more money, maybe financial problems... (G1GKT).*

*I mean, given ... aa ... experience or training, not at all, because ... the ministry gave it twice, early 2000, 2000 ... then, 14 years ago, a ... yes ... then not called, even the State Education Department is not, ok, so that means the number of training is ... very ... not enough ... yes ... yes ... very little ... a ... it really can't help...(G1AK).*

Table 6 shows the analysis of observations on staff training documents. The findings indicate that only 12 (66.7%) schools able to provided staff training documents. The findings indicate that the documents regarding the staff training aspect are still incomplete, which also has implications for teachers' knowledge and skills, teaching and learning processes and student achievement.

Table 6: Staff Training Observation Analysis

	Document Available		No Document	
	No.	Percentage(%)	No.	Percentage(%)
<b>Staff Training Document</b>				
i) School Trainer	12	66.7	6	33.3
ii) Course Timetable	12	66.7	6	33.3
iii) Course Material	12	66.7	6	33.3

## 6.0 DISCUSSION

### 6.1 Teacher Knowledge and Skill

Teacher skills are critical factors in determining the quality of educational experience provided to students (Kelly 2009). Knowledge readiness plays an important role in the teaching and learning process, but there are still teachers who lack the ability to apply knowledge and experience in implementing teaching and learning process (Corcoran, 1981; Saharudin, 1996). The findings of this research show that administrators and teachers believe that teachers' knowledge and skills are good. This finding is in line with the study of Nordin (2011), who found that technical teachers have the knowledge and skills to implement the teaching and learning process. Good teacher knowledge and skills are important in implementing AK subjects as they emerged from the interviews with AK teachers in this study.

Technical education teachers also need to be qualified by having the technical education, professional education, and work experience needed to succeed as a technical and career education teacher (Husted et al., 2003; Billet, 2011b; Asnul et al., 2013). However, descriptive analysis found that 34.6 percent of non-optional teachers teach AK, GKT and RC subjects in daily secondary school. As a result of the interviews, the problems encountered were inexperienced teachers, teachers occupying only one field, teachers lacking technical skills (not optional) and teachers lacking pedagogical skills. In terms of the lack of knowledge, this finding is in line with the study of Abdul Kadir in Lilia (2009) who found that there is a significant difference in the pedagogical content knowledge aspect between new teachers and those who have had teaching experience. Teachers who have teaching experience are able to explain the concept in more detail. They are also able to encourage students to participate in class. The importance of optional teachers for technical subjects was also explained by Rashidah (2001), in his study which found that optional teachers monopolized RC teaching, of which 20 were optional teachers, while only three were non-optional teachers. The choice is appropriate given that RC subjects require certain qualifications especially to build student creativity in the latest technology.

Problem to mastery in three main areas of civil, mechanical and electrical engineering is a major challenge for AK subject teacher. The Inference analysis of this study showed that respondents were more confident in the knowledge and skills of GKT teachers than AK. The quantitative findings of this study support the findings of a study conducted by Jamil (2008), who found that teachers' readiness to teach AK was low. Empirical data also found that the skills of GKT and RC teachers using AutoCAD affected the performance of GKT and RC coursework. Furthermore, this study also found that AK, GKT and RC teachers are still lacking in ICT competency. This is in line with the findings of Azizi and Roslan (2000) who found that teachers' ICT skills were poor. According to Shulman (1987) and Fullan (2014) although a teacher has mastered his or her knowledge, ICT competency related to educational disciplines such

as educational psychology and educational sociology are also important. Therefore, talent development to provide knowledgeable, skilled and motivated option teachers with sufficient numbers is critical. Rosehan (1994) in his study found that teachers of choice need to be proficient in teaching aspects including time management features, student discipline and behaviour, lesson delivery and teaching feedback.

## **6.2 Role of Administrators**

Keller (2005) explains that when making a program decision, an administrator should be attentive to each member to maintain support for a program. Administrative Creativity and innovation is the key to the success and effectiveness of the planning and implementation of a program (Namara, 1998; Asnul et al., 2013; Irdyanti et al., 2016). The empirical data of this study show the role of administrators as responsible individuals at the school level to ensure that decisions and planning are implemented. Meanwhile, the administration's commitment to the subject also needs to be improved. Some of the themes that arise from interviews with administrators and teachers, such as the weaknesses of the relationship between administrators and teachers, the relationship between administrators and students, the administration's commitment to the subject and the management of money allocation of subjects among administrators need to be improved in order to realize the challenges of the Malaysian Education Development Plan (KPM, 2013) to provide quality governance to achieve the objective of ensuring strong school leadership and management is realized.

Some of the weaknesses in the administration's role were also expressed by respondents in open questions such as poor financial management, lack of administrative support for AK, GKT and RC students and teachers. Administrators' low understanding of AK, GKT and RC subjects and the role of administrators at the Ministry of Education, the State Education Department and the District Education Office in monitoring the implementation still need to be improved. This finding is contrary to the opinion of Owen (1991), Keller (2005) and Irdyanti et al. (2016), who stated that administrators have the supportive role of providing the right environment for implementation to occur, the role of administrators as a prerequisite for successful implementation of a program. This explains that the role of administrators from the school level to the ministry level needs to be improved, in order for closer relationships and cooperation to improve the quality of the subjects. As Hashim (1991) points out, administrators need to have close and special relationships with their subordinates to collectively improve organizational performance.

Among the suggestion from respondents from this study through open-ended questions is school administrators needed to understand technical subjects, and administrators need to be creative and innovative in solving problems. Creativity and

innovation are important practices in TVET leadership when planning, organizing and executing effective strategies towards generating skilled and innovative human capital (Abu Bakar, 1991; Irdyanti et al., 2015). Therefore, talent improvement should be made to the role of administrators in implementing AK, GKT and RC subjects as the study by Husin (2005) found that administrative support was a critical aspect that needed to be taken seriously in order to enhance program effectiveness. Azizi Yahya (1999) pointed out that principals need to work well together to ensure that the KHB program can be implemented more effectively. Similarly, a study by Yahya et al. (2003), found that most Life Skills teachers stated that principals need to be attentive and always support and encourage teachers to increase the effectiveness of the implementation of a subject at school.

### 6.3 Staff Training

As administrators conclude that staff training is acceptable, teachers are not sure if staff training is adequate. Furthermore, GKT administrators and teachers agreed on staff training, whereas AK and RC teachers and teachers were not sure if staff training was adequate. In the open-ended questions some themes emerged such as staff training that had not been carried out for the last five years and lack of training in the use of tools and technical skills. The results also show that administrators and teachers have reiterated that in the last five years the number of staff training organized by the Ministry of Education, the Education Department and the Education Office has decreased. In addition, several themes emerged in the areas of staff training such as training of teachers and administrators, training of equipment and machinery and workshop management. In addition, innovative training on the development of interpersonal skills also needs to be conducted. Observations also found that documents related to curriculum implementation, only 66.7% of schools were able to submit documents related to school coaches, course schedules and course materials.

Empirical data showed that talent development aspects such as staff training need to be improved, especially staff training organized by the Ministry of Education and the Department of Education on the knowledge and skills of teachers for all three subjects. Internal training on aspects of pedagogy also needs to be organized by the school. Further training to improve teachers' skills also needs to be evaluated, as well as motivational training also needs to be improved over time. Campbell et al. (2004) recommended that a professional development of a teacher can be carried out by attending short-term and long-term courses. Innovation is needed in schools because teachers need to be trained or retrained because the skills they possess are no longer suitable for effective work in the teaching profession (Cascio, 1995; Luck & Peng, 2010). It is also found that knowledge sharing and skills among teachers are limited

because in general, only one subject teacher is placed in a school, while the knowledge of teachers in their field or field is seen as important and motivating to their students (Ann Lewis, 2007; Asnul et al., 2013; Mohd Tafizam & Ramlee, 2018).

Some themes also emerged based on respondents' answers in open-ended questions such as subject teachers not attending any related courses for this subject, no courses to enhance teacher professionalism, no courses for AK teachers since 2010 and the majority of AK and RC teachers have no equipment and machine maintenance skills. The interview also made it clear that there are still administrators who agree that staff training is poorly organized at the school and district levels. While staff training is one of the factors that needs to be given the main focus on technical education and training towards the Industrial Revolution 4.0 (Klaus, 2017).

The teachers provided feedback that was consistent with the findings of the questionnaire but surprisingly, there was a response from the teacher's respondents stating that the staff training program for this subject had not been implemented in the past 5 to 14 years. The findings of staff training in this study, in line with Zahba's (1999) study of in-service training towards effective school success, found that weaknesses in the implementation of staff training in schools needed to be improved in terms of training planning, training objectives, training curriculum, training environment and training evaluation. Rashidah (2001) found that teachers are still less exposed to proper training and skills to enable them to improve teaching procedure. Therefore, innovation talent development in staff training should be conducted more effectively as suggested by Ramlee (1999) and Jamil (2002). The findings of this study are also in line with the findings of Nordin's (2011) study which found that the series of courses organized by the Ministry of Education Malaysia was inadequate as teachers were expected to benefit greatly after completing the course.

It is undeniable that a teacher's experience in implementing the teaching and learning process as informal training. Kang (2010) and Fullan (2014) point out that staff training is a self-learning activity and a reflection on shaping individual skills, knowledge and expertise. Staff training is a continuous process organized by the school with specific goals and objectives to enhance teachers 'skills and abilities as teachers' skills and abilities have a significant impact on student achievement and learning. However, in the context of the implementation of these subjects, the limited facilities available in most schools make the teaching process only done theoretically (Mohd Tafizam & Ramlee, 2017). The knowledge and skills of the teachers can be said to be at a minimum because most of these subjects are from various fields of engineering and technology that are derived from the Graduate Teaching Course (KPLI) program, which is given a pedagogical exposure of only 12 months. This finding is supported by a study conducted by Ruhizan et al. (2012) found that teachers and schools failed to help students acquire the knowledge, skills and exposure they needed outside of school and at work. This will eventually lead to academic and vocational integration that

emphasizes curriculum integration between the theoretical and practical constraints (Ramlee et al., 2003; Lauglo & Maclean, 2005; UNESCO-UNIVOC, 2013).

## 7.0 CONCLUSION

The deterioration in the quality of the subject, affecting the transformation of technical education in Malaysia. The creative and innovative growth of STEM graduates as outlined by PPPM, to meet the shortage of k-workers for the industry, may be difficult to realize without the efforts of improvement, new solutions, and paradigm shifts especially in the technical curriculum. The weakness of the process dimension is in the aspect of non-creative and innovative staff training by ministries and schools especially in the technical skills of teachers. The survey respondents suggested the appointment of teachers based on appropriate options and technical teacher talent improvement programs such as the skill of using the latest equipment and digital technology.

Based on the open-ended questions, the role of administrators as the top management in schools is critical. Teacher skills in terms of knowledge and technical skills need to be improved and refined in line with industrial revolution 4.0 and TN50 aspirations. The quantitative and qualitative findings of the study also provide clear theoretical implications for the theory of accountability, domain of accountability and the role of creative and innovative administrators in making decisions that are not emphasized in previous theories. Meanwhile, the findings, interviews and observations of this study also provide theoretical implications for the CIPP evaluation model whereby administrators need to be creative and innovative. Theoretical implications have also suggested several new domains to the CIPP model in terms of staff training and teacher appointments according to options. The practical implications defined new talent development for teacher knowledge and skills, the role of administrators and staff training has been suggested by the respondents.

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# Public Resistance and Relief on the Undergraduate Vocational Education under Background of *Merger for Transfer* Policy in China

## ——from Perspective of New Institutional Economics

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### Abstract

The *Merger for Transfer* policy provides a mutually beneficial opportunity both for the transfer of affiliated colleges and the upgrading of vocational colleges in China, but it has been heavily restrained during the promotion process, especially by the public resistance. The dichotomy of formal and informal rules in the theory of new institutional economics can provide an analytical framework for the interaction between government will and public resistance. Web crawler technology was used to collect relevant public opinion data in Sina Weibo, Baidu Post Bar, and other virtual communities. Data was analyzed under the theoretical framework of new institutional economics. The results show that the promotion of undergraduate vocational education is mainly affected by three types of public resistance: Ignorant-rebellious, contradictory-suspicious, and vague-interrogative. These resistances are primarily affected by the intersection of formal rules and informal rules to varying degrees. In essence, they are affected by the social embeddedness of informal rules at three different cultures in tradition, intergeneration and peer group. Therefore, we should improve the educational policy producing, transmitting and assimilating, so as to alleviate and even eliminate the public resistance from different cultures.

**Keywords:** *merge for transfer*; undergraduate vocational education; new institutional economics; public resistance; web crawler

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## 1 Introduction

Affiliated college refers to a unique form of undergraduate colleges affiliated to one university in China. It is jointly organized by common undergraduate universities and social organizations, individual, or local government. It has made an essential contribution to the large-scale development of Chinese higher education, but it has gradually exposed a series of problems in the process of its history. Recently, under the national policies, affiliated colleges are transforming progressively into ordinary undergraduate universities. The way of *Merger for Transfer* put forward by the Ministry of Education in May 2020 means the affiliated college could integrate a high-quality VET college to become an undergraduate vocational university. It provides a beneficial opportunity both for the transfer of affiliated colleges and the upgrading of vocational colleges.

However, *Merger for Transfer* is heavily restrained, especially by the public resistance. Recently, the latest undergraduate vocational universities list was promulgated whilst China's college entrance examination. Therefore, it immediately received attention from candidates and parents all over the country, and soon aroused an upsurge of public opinion to resist transfer of affiliated colleges. Some students of affiliated colleges even conflict with representative of colleges. They even illegally detained their college representative. Under the pressure of students' public opinion, the education departments of Zhejiang, Shandong, and Jiangsu have successively issued announcements to suspend or terminate the transfer. Therefore, why is it so hard to *Merger for Transfer*? How do students' mental structures interact with government policies and school practices? What is it driving from?

Based on the K (KSF) - S (SWOT) model, Luo and Fan (2018) believe that the development of undergraduate vocational university is an essential strategy for the transformation and development of high-quality affiliated colleges. Xing and Guo (2021) believe that *merger and transfer* is the most successful way for higher vocational colleges to upgrade. However, why did the *Merger for Transfer* cause strong opposition from students? In this regard, the theory of New Institutional Economics holds that institutions include formal rules and informal rules. Although formal rules are the basis of informal rules, they rarely become a clear and direct source in the choice of actors. On the contrary, informal rules play an essential role (North, 1990). Based on the perspective of New Institutional Economics, Yu (2015) believed that the policy is the primary factor to stimulate the transfer intention of affiliated colleges, however the transfer intention does not necessarily come true. The traditional social concepts, cognitive deviation of executors, poor communication

mechanism, and other informal rules hinder the effective implementation of the transfer of affiliated colleges (Que & Luo, 2011). However, there is still a lack of research on undergraduate vocational education under the background of merger and transfer from New Institutional Economics. In this paper, the researchers will explore the interaction between government will and public resistance on *Merger for Transfer* policy.

## 2 Research Design

### 2.1 Data Acquisition

We adopts web crawler technology to collect data. This technology is mainly used to manage network public opinion data. *Octopus* is a familiar and easy-to-use data acquisition tool developed by a Chinese company. It does not need to be programmed like *Python*, but only needs to be used by manually customizing collection rules and using XPath tools. We mainly captured the relevant data in Sina Weibo and Baidu Post Bar. The keywords used in the search mainly include *Merger for Transfer*, *undergraduate vocational education*, etc. Besides, we collected the speeches and comments that have aroused extensive discussion through Weibo and Baidu Post Bar about affiliated colleges in relevant provinces, such as Jiangsu, Zhejiang and Shandong. After data collection, the results are exported to excel, and the *Octopus* will automatically complete data deduplication. Then, the researchers manually cleaned the data, screened out meaningless or irrelevant items. Finally, 1637 valid data were obtained, including 1161 messages of Weibo and 456 messages of Post Bars. Table 1 and Table 2 are data examples of them.

**Table 1.** The example of Sina Weibo message

Blog publisher	Blog content	Number of forwards	Number of likes	Number of comments	Commentator	Comment content	Secondary commentator	Content of secondary comments
天啊看看这都几点了	We should keep calm and don't go too far.....	145	4577	1374	AnanLy	Students go to school to study. The undergraduate admission score becomes the junior college admission score, which makes everyone uncomfortable.....	尔等渣渣啊	It is not be recognized by society and enterprises, the same with adult undergraduate education.....

**Table. 2.** The example of Baidu Post Bar message

Publisher	Post title	Post content	Comment ator	Comment content
贴吧用户_5ZWPb7U	#Zhongbei College of NNU transferred# merged into vocational undergraduate	The student information in CHSI is updated once a year. Now it is a bachelor degree. After mergering, it is equivalent to a college degree. In the future, employment and enrollment will be greatly affected. Please pay attention to it.	求求你多了解	New students new methods, old students old methods. The official documents say clearly that you graduate from what identity you come in.

## 2.2 Data Analysis

Based on the above data, this paper uses *Qualitative Text Analysis*. *Qualitative Text Analysis* extracts meaningful patterns or knowledge from unstructured text through the collection and processing of text (Liu, He, Wu, Yang, & Li, 2020). In the analysis, we use Douglas C. North's theory of New Institutional Economics. The dichotomy of formal rules and informal rules in this theory can provide an appropriate analytical framework for the interaction between government will and public resistance in promoting undergraduate vocational education. Formal rules refer to the hierarchy of such rules, from constitutions, statute and common laws, to specific bylaws, and finally to individual contracts(North, 1990, p.36); while informal rules are part of the cultural heritage, such as codes of conduct, norms of behavior, and conventions (North, 1990, p.47).

## 3 Three Types of Public Resistance

Here, formal rules refer to various types and levels of institutional educational arrangements established by the government, and informal rules are a series of inherent conceptual regulations like that vocational education is low-level education formed based on the historical tradition of formal rules. The different performances of the people in formal rules and informal rules form three different types of public resistance and a kind of nonresistance.

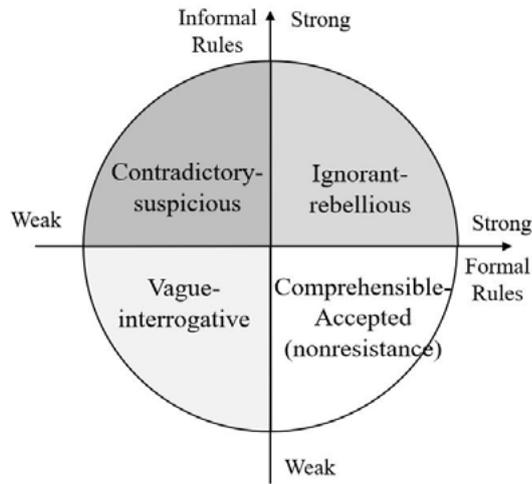


Fig. 1. Three types of public resistance

Table. 3. Performance of different types of public resistance

Types of public resistance	Ignorant-rebellious	Contradictory-suspicious	Vague-interrogative	Comprehensible-Accepted (nonresistance)
Cognitive performance	Misreading formal rules & believing in traditional beliefs	Understand formal rules & maintain traditional beliefs	Do not understand formal rules & convert traditional beliefs	Understanding and believing in formal rules & holding appropriate beliefs
Emotional performance	Extremely rebellious	Suspicious	Interrogative	Accepted

### 3.1 Ignorant-rebellious

Such students are entirely unaware of China's formal rules, such as educational system arrangements, newly promulgated policies, etc. It is results from the interaction of weak role of formal rules and the strong role of informal rules. Such students do not know the meaning of undergraduate vocational education. They mistakenly regard undergraduate vocational education as higher(senior) vocational education. It shows that they confused the difference between the type of education and the level of education. The students even give it an image name, which is called *Education Devalue*. This type of students has the most extreme emotions, and it is easy to make some extreme and even illegal behaviors. Under the joint action of cognition and emotion, the behavior of these students presents two types—irrational ignorance and rational ignorance. Irrational ignorant students express their resistance with aggressive language and behavior. Many extreme online comments express irrational ignorance. For example, students of an affiliated college illegally detained their Dean for up to 30 hours during the argument. Rational ignorance refers to the behavior of quasi rationality under the condition of insufficient information. They express wrong

cognition with seemingly rational language and behavior. These remarks are highly misleading. Even some high school graduates who have not yet entered colleges and universities have been misled. Due to wrong cognition, these students are more worried about the restrictions they will face in entering higher education and even job hunting. However, their concern is excessive. In fact, they will not face any extra restrictions.

### 3.2 Contradictory-suspicious

These students are affected by both strong formal rules and strong informal rules. Specifically, these students can clearly understand the new formal rules. However, at the same time, they are still affected by the relatively backward informal rules. They are still worried that their identity as vocational college students will be treated differently and not recognized by enterprises, which was called boss economics by some students. Some students even call it the *fourth undergraduate*. Therefore, there are intense contradictions in their cognitive world. Cognitive paradox then forms their nervous, uneasy, and skeptical psychology. According to the data analysis, the difference from ignorant-rebellious students is that they can accept the institutional identity of undergraduate vocational education, but they pay more attention on their conceptual identity labeled with *vocational*. Therefore, many students do not dislike the identity of undergraduates, but refuse the identity with the word vocation. This is a manifestation of contradictory psychology. According to the data analysis, these students have a crisis of external trust. They mainly distrust their college other than the State institution.

### 3.3 Vague-interrogative

Vague interrogative student is formed under both weak action of formal rules and informal rules. Specifically, this kind of students not only has a vague understanding of the new formal rules, but also does not believe in the traditional informal rules. They can convert the traditional social concept of inferior vocational education (i.e., informal rules), so their wrong cognition or belief would not be formed. Although they do not have a clear understanding of the new formal rules as the first type of students, the difference between the two types of students is that vague interrogative students are not excessively affected by inappropriate informal rules. Therefore, they do not have resistance, but just show some doubt. Their questions in the online community are also extremely easy to mislead others. Such questions seem normal, but they are easy to cause unnecessary misunderstandings. Because, they always repeatedly emphasize the difference between undergraduate vocational education and undergraduate university in the form of questions, making it difficult for others to pay attention to the relationship between them. At the same time, such students easily to

lose their position, easily misled by others, but their subjective consciousness is not strong.

## **4 Causes of Public Resistance Analyzed from Institutional Point**

The promotion of undergraduate vocational education needs the joint force of formal rules and informal rules. According to North (1992), although formal rules can be changed by the government, informal rules change slowly. Therefore, changes in formal rules or their implementation will lead to an unbalanced state (North, 1990). If we only pay attention to rules, we will form an insufficient and often wrong belief in the relationship between formal rules and performance (North, 2008). In other words, in the process of legalization and institutionalization of undergraduate vocational education, the key is the legitimacy and institutionalization of informal rules. Therefore, this part will take informal rules as the starting point for an institutional analysis of untimely informal rules from three levels: tradition, intergeneration, and group.

### **4.1 Academia or Technology: Value Inequality in Traditional Culture**

Informal rules from traditional cultural have the most profound impact on people. In China, this is reflected in the unequal status of academia and technology in Confucian culture. In Chinese classical works, many famous sayings reflect this inequality. Dewey (1995) also talked about this inequality in *Democracy and Education*. He said that in education, this inequality finally culminates in the antithesis of vocational and cultural education.

In the Chinese concept, the impact of this inequality is hardly to change. Looking back on the history of China's education reform, we can find some evidence. In the view of New Institutional Economics, the education system is the result of the institutional game among individuals. The game often has some unpredictable institutional consequences (Kang, 2003). In the 1990s, the reform of a series of formal rules such as economic system and educational system contributed to the marketization of the vocational education. The original advantages of vocational education have quietly disappeared. Vocational education gradually depreciated. People flocked to higher levels of general education. These are the unintended consequences of informal rules caused by formal rules. Although China's modern vocational education has accumulated advantages in its institutionalization, with strong attraction in some stages especially during 1980s and the first half of 1990s, the value inequality in the consciousness of the Chinese people between academia and technology reappears when they are labeled by vocational education.

#### 4.2 Me or Home: The Moral Convention between Generations

The informal rules hidden in the process of intergenerational transmission are also crucial reasons for students' resistance. Specifically, they are the moral regulations about learning embodied in the family's educational values. Most Chinese families seem to pass on such a value to their children, that is, being admitted to vocational college is guilty. Going to general university has become an invisible moral convention imposed by some parents on their children. Even government officials, school teachers, or scholars uphold the concept of folk pedagogy, who tell their children to avoid vocational education (Zhou, 2021).

Therefore, avoiding vocational education seems to be an invisible moral constraint. This makes students develop irrational beliefs to use moral thinking to measure different types and levels of education. More specifically, as students of affiliated colleges, their moral thinking always revolves around money. The tuition fees of affiliated colleges in China are much higher than those of state colleges. Therefore, they are willing to pay more tuition fees to obtain an undergraduate degree, but the *merger and transfer* broke the moral defense they stick to in their hearts. Just as some scholars said, different thinking modes and spiritual world can be seen from the meaning construction of the symbol of money treated by various student groups (Cheng & Kang, 2016).

#### 4.3 Independence or Crowd: The Opinion Climate within Group

Informal rules are also formed in peer groups. The informal rules of peer groups are called *Opinion Climate* in communication. It refers to the public opinion atmosphere created by the dominant opinions in a group. As a force of public opinion, *Opinion Climate* often leads individuals in the group to fall into *A Spiral of Silence*. In *A Spiral of Silence*, public opinion is the dominant opinion that forces people to abide by their attitudes and behaviors. Expressing opposite opinions will lead to the risk of isolation (Noelle-Neumann, 1974). Some students keep silent to avoid being isolated, while others have no opinions because of their ignorance. These are the regulatory role of strengthening informal rules in the group. Although the spiral of silence is not directly related to culture, it is related to mental elements such as people's instinctive response, self-protection consciousness, and sociality. Therefore, it is intractable and stubborn.

More seriously, the *Opinion Climate* in the student group is often mixed with the *Anti-school Culture* of young people. The *Anti-school Culture* is common in western society. In the *Merger for Transfer*, Chinese students also appeared the *Anti-school Culture*, although Chinese culture is so different from western culture. Affected by the traditional culture, some students believe vocational education will solidify their original family class, so the identity transformation from general education to vocational education stirs up their *Anti-school Culture*, which was transmit among student group, forming *Opinion Climate*, where wrong information was re-produced.

## **5 Conclusion and Suggestion**

According to the above results, people's irrational behavior is first attributed to emotional factors, and then traced back to the cognitive level, which is behind the interaction between formal rules and informal rules. Untimely informal rules are embodied in three cultural levels: tradition, intergeneration, and group.

Therefore, the resistance to the institutionalization of undergraduate vocational education would be eliminated from three levels: informal rules, cognition, and emotion. The core of this process lies in the proper circulation of rule information and the reproduction of rule information by the people. According to Stuart Hall's four stages of information exchange: production, transmission, distribution/consumption, and reproduction (Hall, 1980), people's reproduction of information is directly subject to the first three stages. In suggestion, firstly, we can mitigate the impact of informal rules as cultural heritage through the systematic production of policies. Secondly, we can bridge the cognitive dislocation between the type of education and the level of education through the effective transmission and distribution of policies. Thirdly, we can eliminate the excessive moral regulations between generations and the irrational collective emotions among groups through the rational consumption of policies. From the above three aspects, we may correct the deviation of public information reproduction and promote the better institutionalization of undergraduate vocational education in China.

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Public Resistance and Relief on the Undergraduate Vocational Education under Background of  
Merger for Transfer Policy in China — from Perspective of New Institutional Economics

**BACK**

# Attractiveness of VET in China: A study on secondary vocational students and their parents

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## ABSTRACT

The attractiveness of vocational education and training in China is becoming increasingly important for both policy makers and practitioners. This study examines the perceptions of secondary vocational students and their parents, about the attractiveness of vocational education and training in China. For data collection, 54 Students and 27 parents were selected from three kinds of vocational programmes in Shanghai. The results show that general high schools are perceived to be far more attractive than secondary vocational schools. One major finding, is that the attractiveness of the three programmes that are part of this study, increases as the programme length increases. However, it is not the higher diploma, but rather the potential long-term career promotion space in the labour market, that really influenced students' priority for higher education.

**KEYWORDS:** China; attractiveness; vocational education; students' perspectives; parents' perspectives

## Introduction

The attractiveness of vocational education and training (VET) is of interest in many countries, both developing and developed. And the societal standing of vocational education is often perceived to be low, compared with other education sectors (Billett 2020). Thus, enhancing the attractiveness of VET, has been identified globally as a major challenge for quite some time. However, there has always been dispute and debate in the research and practice areas about this issue (Lasonen and Gordon 2009; Ratnata 2013; Ajithkumar and Pilz 2019). Although the low standing of vocational education is a global concern, its manifestations, impact and potential remedies are likely to be quite country distinct (Billett 2020). This paper mainly focuses on the

attractiveness of VET in the Chinese context and aims to promote the understanding of this issue with a special focus on secondary vocational students and their parents.

In their research exploring young people's perceptions of VET in England, Atkins and Flint (2015) maintained that perceived attractiveness of VET was closely associated with societal perceptions of their programmes, which is considered by young people to be negative.

According to findings from Industrial Training Institutes (ITIs) in India, the attractiveness of ITIs has shifted over time. It was concluded that the low status associated with these institutions is slowly changing, with the increasing realisation that the skills acquired at an ITI can provide the basis of successful career (Ajithkumar and Pilz 2019).

In China, the issue of VET attractiveness has caused wide concerns in all sectors of society; the Chinese government is paying more and more attention to VET, and its investment is growing (Shi 2013; Li et al. 2019). As part of a national skill formation system, VET has played an important role in the rapid development of the economy, since China's Reform and Opening-up (Xu 2019). According to a report published by Central Institute for Vocational and Technical Education on Chinese vocational education (2002-2012), 72.65 million students graduated from various vocational schools at all levels between 2002 and 2012.

However, the development of vocational education in China faces a dual dilemma, where the government demands are incompatible with the demands of enterprises and individuals (Xu 2019). Given that the role of employers in the skill formation system is minimal, VET in China is typically school-based, and employers do not have any legal obligation to participate in VET development (Wang and Jiang 2013). A study based on ethnographic fieldwork conducted in three secondary vocational schools (SVSs) between 2007 and 2012, found that although vocational education is growing rapidly in China, parents and students have deeply-held objections to this form of schooling (Hansen and Woronov 2013).

So, why is vocational education unattractive to Chinese students and their parents? Existing research in China, explored the answers from different perspectives. When analysing the components of vocational education attractiveness, Fu and He (2016) concluded that it is influenced by two important factors: the attractiveness of vocational education itself and that of expected work positions, with the latter being the most important determining factor. Based on the theory of cultural capital, Wang (2017) maintained that the initial lack of cultural capital, as well as the difficulties in cultural capital transformation and reproduction, lead to the lower attractiveness of vocational education in China.

All these studies undoubtedly contribute to answering the question of why VET appears to be less attractive than general education; they reveal that the two most

important stakeholders, students and their parents, have a significant influence on the attractiveness of VET. However, there is no empirical study specifically on the attractiveness of VET in China, by focusing on students and parents who are in the system. Based on this consideration, this paper aims to fill the gap with a study of the perceptions of both students and parents, on the attractiveness of VET.

### **Theoretical concepts of VET attractiveness**

Due to a lack of theoretical and conceptual work on VET attractiveness in China so far, this study aims to provide approaches relevant to this theme in an international context. In many countries, the aim of enhancing the attractiveness of the VET system has been identified as a policy priority in order to increase the value of human capital. Lasonen and Gordon (2009) pointed out, that the nature of VET attractiveness is a political concern that has not been thoroughly analysed in research.

Although in educational research no agreement on standardised concepts and definitions of VET attractiveness have been reached, it is still necessary to review some extremely significant approaches to the attractiveness of VET. As outlined by Lasonen and Manning (2001), the terms ‘attractiveness’ and ‘esteem’ are related to the behaviour of individuals, or groups. Based on this background, VET attractiveness can be regarded as a factor that may influence people’s decision in choosing SVSs.

By using factor analysis, Pimpa and Suwannapirom (2008) revealed five factors influencing Thai students’ choices of vocational education, including personal attitude, curriculum, potential employment, attractiveness of campus, and tuition fees.

Ratnata (2013) claimed that the concept of attractiveness has broad dimensions, such as the perceptions of employers and labour market position, VET graduates’ skills in relation to the business or industry needs, and VET graduates’ earning potential.

For Lovšin (2014) the lower attractiveness of vocational and technical education coincides with the fact that representatives of lower social classes have a weaker economic position and more frequently have vocational and technical education qualifications than representatives of higher social classes.

A report of CEDEFOP (European Centre for the Development of Vocational Training, 2014), confirmed the complexity of defining the concept of VET attractiveness. It indicated that definitions in literature focus on two dimensions: the subjective nature of attractiveness (in the eye of beholder), and the factors and characteristics that impact on the attractiveness (such as relevance of Initial VET) of programmes to the labour market, as well as quality assurance and recognition of qualifications.

Rintala and Nokelainen (2020) concluded that the standing and attractiveness of VET are related to each other; attractiveness is related to whether VET can deliver the desired outcomes, such as a good standard of living and opportunities in the labour market or in further education.

For explaining the concept of VET attractiveness, Berger and Pilz (2010) focused on the respective motives of the actors and defined four groups of stakeholders: individuals seeking training, companies providing training, the labour market as an economic dimension and society at large. From the perspective of individuals, attractiveness means potential earnings, career opportunities, job security and fulfilling jobs. When interpreted from a company perspective, attractiveness means investing in training or employing skilled workers to keep pace with the change of modern production process and manufacturing complex products. In view of the sociological perspective, attractiveness means the status of an individual in the society who has completed VET must be quite equal to those who have completed general education. Finally, from the point of view of the state, the state could influence training as well as generate tax and social security revenues through establishing a link between vocational qualifications and employment legislation and the law on collective bargaining (Ajithkumar and Pilz 2019).

Winch (2013) also put forward his view from the perspective of the stakeholder, “by ‘attractiveness’ in relation to TVET, is meant the preferability of TVET compared with alternatives”. For individuals this means the attractiveness of TVET in preference to direct engagement in the labour market, or the pursuit of higher education. This is also the case for parents’ preferences for their children. For employers and trade unions, it relates to consideration of the alternatives of not providing TVET at all, or of hiring individuals who have already received TVET elsewhere.

To sum up, even though a wide divergence exists in the approaches taken to this issue, the concept of VET attractiveness mainly comprises two general dimensions: subjective approaches (behaviours or attitudes) and objective approaches (external factors). In order to link individual behaviour or attitudes to external factors, we shall, therefore, take a stakeholder orientated approach here. Therefore the concept by Berger and Pilz (2010) and the approach of Winch (2013) will establish the theoretical foundations for our following research. Below we will explain the methodology of this study.

## **Methodology**

As the two most important stakeholders in the VET system, students and their parents have a significant impact on the attractiveness of VET. As users of the system, they

are influencing agents or ‘enablers’ in the process of creating change (Ajithumar and Pilz 2019). An Australian study (Billett, Choy and Hodge 2020) suggests that it is necessary to identify factors shaping young people’s decision-making about post-school pathways and preferred occupations, when it comes to enhancing the standing of vocational education. Based on the above consideration, this paper aims at expanding on, and filling the gaps in knowledge of the role and impact, of the perceptions of both students and parents, on the attractiveness of VET in China.

Our study was guided by the above discussed aspects of attractiveness by the following questions:

- RQ1: What constitutes attractiveness?
- RQ2: How do students perceive the attractiveness of SVSs?
- RQ3: How do parents perceive the attractiveness of SVSs?

In this study, we mainly used qualitative methods to explore students’ and parents’ perceptions of VET attractiveness. If we used the quantitative method, the research question may be simplified to the relationship between different variables, ignoring the details and complexity of this issue. In contrast, through semi-structured interviews, we can derive a detailed description of the interviewees’ perceptions of VET attractiveness.

Under the guidance of targeted sampling, the final selection of the interviewees went through three steps: Firstly, sampling of regions. The researchers chose Shanghai as the study region, mainly because Shanghai is the demonstration pilot zone for modern VET reform with Chinese characteristics, and all of the three programmes exist in the Shanghai VET system as mentioned above. Secondly, sampling of specialisations. The SVSs in Shanghai offer 18 categories of specialisations, mainly covering modern manufacturing and the modern service industry. The researchers chose to collect data from the typical specialisations, such as financial accountant, international language application, international economy and trading; these specialisations were offered in most of the SVSs, including regions outside Shanghai. Thirdly, sampling of specific students and parents. Considering the representativeness of the sample, students with different performances (good, average or poor) were selected from the target classes.

Two interview guidelines were designed with the objective of assessing students of SVSs pursuing typical specialisations, and their parents. Both guidelines were based on an adaptation of an instrument designed by Ajithumar and Pilz (2019) for the Indian context. This approach was selected because it covers the theoretical framework as mentioned above, and is already proven as a valid instrument.

The student interview guidelines were structured taking into account the following: the individual perspective, economic perspective, enterprise perspective and the perspective of contribution to the nation, in addition to basic information, such as gender, age and work experience. Similarly, the parent interview guideline includes: the individual perspective, the economic and labour market perspective and the perspective of contribution to the nation, in addition to the basic information, such as origin, occupation and age. The interview guidelines underwent several drafts to adapt to China's national conditions, and ensure that the questions could be clearly understood by target interviewees. Take the question *'From your point of view as parents, what are the strengths and weaknesses of VET system'?* as an example. This question seems to be too general for Chinese parents to answer; actually, many don't know much about the VET system. Thus, the words 'VET system' were changed to 'the SVSs'. Another example is: *'If you compare the status of a VET degree and an academic degree, what is the difference and why'?* The fact is that vocational students in China, cannot obtain any kind of degree in the VET system, unless they make a transition to undergraduate education. Thus, we changed the word 'degree' to 'diploma'.

The data were collected from students of six schools in Shanghai, and their parents, over two months. The schools were selected by local contacts. The participants of the study were selected with the support of the teachers, and by the willingness of students and parents to participate.

As shown in Table 1, a total number of 54 students participated in the survey, and 27 parents were interviewed face-to-face. These participants are distributed evenly across the 3-year Programme, 3+2-year Programme and 3+4-Programme.

**Table 1.** The sample distribution

Programme	Students participants	Parents participants	Total
3-year Programme	18	9	27
3+2-year Programme	18	9	27
3+4-year Programme	18	9	27
Total	54	27	81

Source: calculated by the researchers.

Before the beginning formal interviews, the researchers explained the purpose of the study, and that no conclusions would be drawn from statements in the paper in relation to single interview partners. Additionally, all of the participants were told that the interviews would be conducted anonymously, and then started recording with their permission. The duration of these interviews was 10-30 minutes; for organisational and cultural reasons, it is difficult to arrange a face-to-face interview for a longer time. The researchers transcribed the recorded interviews and translated them into English.

All qualitative data from the interviews were analysed by NVIVO 11 Plus. With the help of this research tool, the data was coded under the guidance of the theoretical framework. Additionally, all the participants were encoded and numbered. Participants from the 3-year Programme were encoded as S, the 3+2-year Programme as H and 3+4-year Programme as U. For example, student S1 represents the first student participant come from 3-year Programme.

## **Results**

Before we present the basic information from the interviews, we give a brief descriptive overview of the participants' background.

As shown in Table 2, the student participants included 11 men and 43 women, the age group ranges from 15-19 years old, with 23 of them in grade 10, 25 in grade 11, and 6 in grade 12. Among the 3-year and the 3+2-year Programmes, the number of student participants from outside Shanghai was found to be slightly higher than that of local student participants from Shanghai. However, in the 3+4-year Programme, none of the student participants came from outside Shanghai. When it comes to working experience, up to 35 students were found to have no kind of work experience, while 19 of them had no more than 6-months work experience.

**Table 2.** Attributes of the student participants (N=18)

Attributes	Category	3-year programme	3+2-year programme	3+4-year programme
Gender	Male	6	2	3
	Female	12	16	15
Age	15	0	2	0
	16	6	8	9
	17	6	8	3
	18	5	0	6
	19	1	0	0
Origin	Shanghai	8	8	18
	Outside Shanghai	10	10	0
Grade	10	7	7	9
	11	11	11	3
	12	0	0	6
Working experience	None	11	10	14
	Less than 6-month	7	8	4

Source: calculated by the researchers.

The data in Table 3 reflects the student's socio-economic background, most of them come from working class families, or the lowest level of middle-class families, which is lower in comparison with students in general education in the Shanghai area.

**Table 3.** Parents' occupations

Gender	Occupation	3-year Programme	3+2-year Programme	3+4-year Programme
Mother	Freelance	2	1	2
	Accountant	4	1	2
	Office staff	4	1	4
	Home maker	3	2	0
	Doctor	1	0	0
	Factory worker	1	3	2
	Subway staff	1	0	0
	Self-employed person	1	1	1
	Clothes saleswoman	0	1	0
	Courier	0	3	1
	Teacher	0	1	2

	Restaurant worker	0	2	2
	Train conductor	0	0	1
Father	Freelance	1	0	1
	Accountant	1	0	0
	Office staff	3	5	6
	Driver	3	0	3
	Bank staff	1	0	0
	Factory worker	2	2	4
	Subway staff	1	0	0
	Self-employed person	5	2	0
	Clothes salesman	0	1	0
	Courier	1	1	1
	Restaurant worker	0	2	1
	Company manager	0	1	0
	Security guard	0	1	0
	Sanitation worker	0	1	0

Source: calculated by the researchers.

The following presentation of results is structured in line with the general research questions introduced above.

### ***Findings for RQ1: What constitutes attractiveness?***

Among the three dimensions of attractiveness, attractiveness to the individual is heavily emphasised, both by students and their parents. The second crucial perspective emphasised by the participants is the attractiveness of the qualification to the labour market, followed by the attractiveness to society.

The data shows that the attractiveness of SVSs is often compared with the general high schools, and the SVSs are perceived to be not as attractive as the general high schools. Most of the student participants scored poorly in the middle school exams, with percentage marks less than 60%. Based on their academic performance, students with lower marks are diverted by the system to SVSs. As one student commented, *'The main reason for my choice of vocational education is the poor performance in academic learning. Unfortunately, I didn't even reach the minimum admission score in the entrance examination of general high schools'* (student S5). Thus, the SVSs are often regarded as the special places for students who cannot perform well in academic learning.

When it comes to the weakness of the SVSs compared with general high schools, the student participants emphasised three factors: inefficient academic learning,

difficult learning environment due to a lack of motivation by students and low social acceptance of the diploma. In addition, almost half of the parent participants were of the opinion that the status of vocational education is lower than that of general education. When asked about their first impression of SVSs, one parent responded that, *'SVSs are schools with a bad reputation and low status, and cannot be regarded as the same education level as general high schools'* (parent U1).

In the specific context of China, three main aspects impacted on the attractiveness of SVSs in particular. Firstly, the main appeal of vocational education is that it offers opportunities for further education. All of the student participants intend to undergo further education after graduating from SVSs, but they also mentioned the difficulties of being enrolled by the university. Secondly, the student participants believe that the practical competence and qualifications will guarantee their entry into the labour market in a short time but acknowledge that it is still hard to get good jobs because of the disadvantage of the diploma. As one student said, *'The social recognition of an undergraduate diploma is obviously higher. If two graduates, one from the university and the other from the vocational college, compete for the same position in a large company, the interviewer is more likely to choose the former'* (student S6). Thirdly, according to the responses from participants, the social discrimination of vocational education has been changing in the past few years. Nevertheless, it is still difficult to change the prejudice to vocational education completely.

### ***Findings for RQ2: How do students perceive the attractiveness of SVSs?***

The results of the data analysis show that less than half of the participants give preference to SVSs at the upper secondary stage. Some students frankly state that they cannot perform well in the field of academic learning, let alone stand out in the highly competitive general high school entrance examination. Due to China's household registration system (hukou), students coming from regions outside Shanghai, were not even allowed to take part in the general high schools' entrance examination (Xiong 2015). This system categorises citizens into urban and rural residents of a particular location, which means favouring urban residents in resource allocation, and discriminating against rural residents (Afridi et al. 2012). Under this system, those students with non-local registrations cannot enjoy the resource of general high school education. If they intend to receive upper secondary education in Shanghai, they have to choose SVSs, or return to their hometowns to receive general high school education.

In contrast, some student participants who choose vocational education, attribute their choice to: less learning pressure, better job prospects and special enrolment opportunities for higher education. A student coming from the 3+4 Programme stated that, *'I can make a transition to the university directly after graduating from SVS, without the necessity of passing the entrance examination. It is less competitive when*

*compared to the traditional way' (student U7).*

When it comes to the choice of their specialisation, the most important factors appear to be potential job prospects, such as possible salary, welfare treatment and career development. The student's study interest ranks as the second most important influence. Lastly, it is a surprise to find that the family occupation background also plays an important role in the students' decision-making process. As one student commented, *'The reason I chose this specialisation is that my parents are engaged in relevant occupations. They are familiar with the industry, which would be conducive to my career development' (student H17).*

Most parents expressed support for their children's choice of vocational education, however, 18 of the participating students acknowledged that their parents were not happy with their choice, but were optimistic about the SVSs. On the other hand a few students felt that their parents were extremely disappointed with their choice.

Although the parents generally showed a positive attitude, social discrimination against vocational education is still a reality. Nearly half of the interviewed students, commented that many of their friends think that vocational education is not a wise choice, mostly because of limited access to higher education. The data also shows that the public opinion of SVSs is still dominated by negative perceptions, and some students tend to associate vocational education with the secondary labour market.

Even so, the student participants still confirm the value and significance of SVSs in the current society. As one student said, *'everyone has their role to play in the diverse society. If we compare the society to a house, the engineers are responsible for planning and designing, while the skilled workers are responsible for building. Without the skilled workers' devotion and dedication, the house cannot be built successfully' (student H2).* Some other student participants stated that investment in SVSs is growing faster and faster, because of the importance of cultivating skilled workers to accelerate economic development, and maintain social stability. One student summarised, *'I think that vocational education receives a lot of attention from the local government. The main reason is that vocational education can provide skilled workers for the local economy.*

*Also, vocational education is conducive to promoting employment. If the graduates cannot find jobs, society will fall into chaos' (student H12).*

However, compared with the physical construction of SVSs, the software part remains to be improved. For instance, some students commented that they would not have the opportunities of workplace learning until the last semester, and it seems impossible to accumulate practical experiences in the school. One student stated that, *'For the seven years of learning, the enterprise internship is arranged in the last semester. Most of our learning activities are organised by the school, while the enterprises participate in few activities. Without the workplace learning in the*

*enterprises, we can only accumulate more theoretical knowledge but not practical experiences' (student U17).*

Another factor heavily emphasised by the students is that the professional level of teachers needs to be improved, especially the traditional theory-orientated teaching method. Only if the students graduating from SVSs are well recognised by the labour market, can vocational education truly obtain the respect and esteem of society.

### ***Findings for RQ3: How do parents perceive the attractiveness of SVSs?***

The data revealed that the attitude of parent participants towards SVSs, underwent a dramatic change, before and after the students' decision for vocational education. For most of the parent participants, the image of vocational education cannot compete with general high school education at first, but some of the parents indicated that they knew little about SVSs before they were faced with the decision making. One of the parents commented that: *'To be honest, we have never considered choosing vocational education before the entrance examination. Our greatest wish is that our child can be enrolled by general high schools. But when the results of the examination were released, we have to accept the reality' (parent H8)*. Due to the poor performance in academic learning at the junior high schools, a number of students suffer with feelings of extreme inferiority. After a period of learning in the SVSs, a number of parents were delighted to find that their children became more confident than before. Some other participating parents also argued that SVSs provide a platform for diverse career development, and academic performance is no longer the only criterion to evaluate their children.

Furthermore, some parents disagree with the view that the job opportunities and income of university diploma holders are much better. They maintained that, it is not the diploma but the competence that can guarantee the success of one's career. As stated by one parent, *'If vocational students could obtain skills and authoritative qualifications, together with the opportunity and effort, there's no doubt that they can also achieve a bright future' (parent S8)*. In addition, a few of the parent participants stated that the SVSs could provide students with the opportunity to understand and adapt to the complex society in advance, which will be to their advantage in their entry into the labour market.

However, the disadvantages of the SVSs also need to be seen rationally. Some parent participants contended that the SVSs should pay more attention to building a positive culture of school learning, because youths at this stage are not mentally mature and their behaviour is easily influenced by peers. The lack of attention to, and low quality of, academic learning in SVSs was emphasised by some parents. One of the parents insisted that, *'the gap between the SVSs and general high schools in academic learning is widening, and the relatively poor academic performance of*

*children would limit the possibilities of their career development' (parent U3).*

With regard to the question of encouraging other parents to enrol their children in the SVSs, nearly half of the parent participants responded pessimistically, saying that it seems impossible to encourage parents to enrol their children in the SVSs. As stated in the interviews, without objective restrictions, most of the families tend to choose general education as their first choice. One of the parents frankly said, *'In the Chinese social environment, most of the parents have a strong sense of comparison, and they may try their best to send their children to general high schools because they're afraid of losing face' (parent U7).*

In order to solve this embarrassing situation, some parents emphasised the significance of propaganda by outstanding personalities, and the demonstrations of the real vocational schools. They also suggested that the SVSs should open their doors to the public, and provide more possibilities for close observation and deep communication between different stakeholders. Thereby, the misunderstanding and lack of knowledge about vocational education would be greatly alleviated. In addition to the above advice, some participating parents also confirmed the importance of reducing the influence of traditional education concepts; because, some Chinese parents regard children as part of their lives, and take it for granted that parents should make decisions for their children, even if the career path they choose is not suitable for their children. Taking this into account, it would be far better if parents provided a more relaxed family environment, where children are encouraged to make decisions.

## **Discussion**

Attracting young people to VET in China has become increasingly important, for both policy makers and practitioners, yet it is striking that very little empirical research has been carried out on the subject. To shed light on the possible misunderstanding of this issue, this study used a much more empirical approach than its predecessors, by focusing on the perceptions of secondary vocational students and their parents regarding the attractiveness of VET.

As commented earlier, the participants can be divided into three groups, including the traditional 3-year Programme, 3+2-year Programme and 3+4-year Programme. Students completing the 3+2-year Programme and the 3+4-year Programme have the opportunity to move on to higher education directly. The difference between the two programmes is that the students completing the 3+4-year Programme can eventually get a bachelor's degree, while the students completing the 3+2-year Programme cannot get any academic degrees, unless they pass the university entrance examination. By comparison, the students completing the traditional 3-year Programme, do not have the opportunity to enter higher education directly. If they want to get further education, they have to pass the entrance examination.

One major finding of our study is that the attractiveness of the three programmes increases in line with the increase in programme length. Most of the participating students and parents indicated that the students would aim to get a higher diploma or degree. Opportunity for further education is regarded by both students and parents, as an important factor in choosing vocational education. In addition, this factor even affected students' choice of specialisations. Those specialisations that have more possibilities to provide further education are generally favoured by students and their parents. Thus, the 3+4-year Programme specifically, is far more popular than the other two programmes.

For some of the interview questions, students gave totally different answers to the question of other people's views on their choice of vocational education, and they would emphasise the uniqueness of the 3+4-year Programme. As one student explained, *'the 3+4-year Programme is quite different from the traditional programmes, and we also have the opportunities of receiving undergraduate education' (student U10)*. After then, most of the people would express the appreciative attitude. After they have been told about the uniqueness of the programme, people are more appreciative. Participants gave a similar response when they were asked to give their views on the statement that graduates with a university diploma will have more job opportunities and higher income, both students and parents from the 3+4-year Programme, argued that students completing the 3+4 year Programme can also get a university diploma after seven years of study, and emphasised the difference between this and the other two programmes again.

When comparing the status of a VET diploma and an academic diploma, most of the participants agree that the status and recognition of an academic diploma is greater than a VET diploma. This may be explained by the response of parents regarding their expectation of the children's future career; according to the data, a considerable number of parents hope that their children could work for the government or well-known enterprises. However, most of these jobs require at least a bachelor degree. Candidates without a degree do not even have the opportunity to register for the written examinations as the first step of the job application process. Furthermore, it is worth mentioning that almost all of the participating parents believe that entrepreneurship is not a realistic option for the students who have just stepped into society, even though it does not require an academic diploma or bachelor degree.

In general, the results of the study reveal that participating students and parents have a pessimistic view of VET attractiveness in China. As pointed out by Winch (2011), one of the most crucial obstacles to overcome in order to make TVET attractive is the lack of demand of from potential students and their parents. Clearly, after eliminating objective restrictions, the attractiveness of SVSs still failed to equal that of general high schools. An ethnographic study, conducted in three Chinese vocational secondary schools between 2007 and 2012, also found that vocational studies are mostly chosen

by default, or as a last resort, rather than by personal or family interest (Hanson and Woronov 2013), reflecting the low status and reputation of SVSs, when compared with general high schools.

From the perspective of individuals, attractiveness means potential earnings, career opportunities, job security and fulfilling jobs (Berger and Pilz 2010). As discussed by Winch (2011), the attractiveness of TVET to individuals means well-paid jobs, high status of courses and vocational qualifications and the possibility of transition into higher education. For China we find out, that the most important motive is career opportunities. Also, the peer learning environment and work-based learning have great influence on the attractiveness of VET. Like other relevant research (Berger and Pilz 2010; Winch 2013), this study also reveals that the lack of appeal of SVSs can be attributed to both internal and external factors. One of the most important internal factors is the poor learning environment; recent studies on the topic of VET attractiveness came to a similar conclusion, finding that vocational programmes provided by schools, are associated with a less desirable learning environment (Russo et al. 2019; Rintala and Nokelainen 2020). The poor learning environment causes students to have a negative impression of VET, and shows the importance and urgency of creating a positive learning environment for all the students participating in vocational programmes.

School managers may need to adapt pedagogy to ensure that young people would be educated to be sufficiently resourceful and to be able to handle creative and flexible learning programmes (Lumby and Li 1998). Another internal factor is the ignorance on the part of educators about work-based learning. One empirical study, found that a supportive climate in the real workplace environment has a significant impact on the workplace learning success of vocational students (Nisula and Metso 2019). However, as can be seen from the data, the student participants have almost no internship opportunities in enterprises, until the last semester. At present, the Chinese vocational education system is dominated by vocational schools which are almost closed due to lack of support, and a lack of connection with industries and enterprises (Li and Tang 2016). Thus, there is a great need for vocational schools to concentrate more on cooperation with enterprises.

One of the most important external factors influencing VET attractiveness, as also discussed in the concept by Berger and Pilz (2010), is the prejudice from society, which has existed from the time VET was first introduced to China from abroad, early in the twentieth-century (Schulte 2013). For educational borrowing to be successful, the different educational, social, economic and cultural conditions appear to call for a variety of educational arrangements, rather than one particular system (Barabasch et al. 2009). A historical study on this topic, maintained that vocational education was embedded in an existing framework of systematic, and widely practised, discrimination and segregation of the population (Schulte 2013). Schulte (2013, p.

226) also contended that vocational education was an ‘unwelcome stranger’ in the Chinese cultural system.

In their historical overview on the philosophy of vocational education, Schmidtke and Chen (2012) found that borrowed philosophies were always adapted to Chinese circumstances by maintaining elements of a Confucian framework. Since ancient times, the view that ‘A good scholar can become an official’ has been the mainstream education value in China, which has laid the foundation of the status of academic education, because it seemed that academic education was for the ‘upper class’ (such as officials, lawyers, scientists and so on), while vocational education was for the ‘lower class’ (such as workers, farmers and so on). Therefore, it is no wonder that people consider general education as the mainstream and preferred education choice, and think that vocational education is a poor substitute for general education; the helpless choice of losers in academic learning. Changes to the current situation may need more patience and effort, especially long-term propaganda and investment from government.

What is surprising is that all the student participants stated that they intend to carry on to higher education after graduating from SVSs. The enthusiasm of students, and their parents, for higher education can be clearly seen from the interviews. The preference for higher and formal education, endangers what is seen as the lower level of vocational and informal adult education, which undermines China’s skill formation system (Xu 2011). However, what we need to think about seriously is the source of their enthusiasm. On the surface, it might seem that these vocational students would like to obtain a higher diploma through further study, whereas, it is the potential career development in the labour market that really influences their ambition for higher education. The reason being that reform of the educational system in post-reform China, has channelled a large group of rural youth to vocational education, without granting them enough chance of upward mobility (Koo 2016).

Compared with an academic path, the returns of human capital investment are not guaranteed in a vocational path. Students graduating from SVSs are often linked with blue-collar jobs, which generally means lower salary, bad working environment and limited promotion opportunities. Interestingly, another study in south-east England came up with contrary findings, which means that, after following a Level 3 vocational pathway in upper secondary education, vocational learners choose not to progress to higher education (Aynsley and Crossouard 2010). Comparing with the Chinese situation, the reason is similar in that the transition to higher education does necessarily guarantee a bright future for vocational students.

As shown in Table 3, most of the student participants in vocational programmes come from families with a lower socio-economic background. Nevertheless, vocational education was regarded by parents as a broken ladder that cannot provide upward mobility for children in China (Xiong 2015). In addition, to some extent vocational education promoted and perpetuated class distinction in China (Ling 2015). Thus, the

challenge for China's vocational education system, is not to merely produce youth to fill the lower ranks of the service sector, but to provide genuine and meaningful skills to students, who are not stigmatised by their attendance (Hanson and Woronov 2013).

In conclusion, our findings underline the value of models of attractiveness focussing on the motives of the actors like the one from Berger/Pilz and Winch. Approaches based on actor motives are a fruitful basis for empirical research in the field. To a large extent, the attractiveness of VET for individuals in China counts more to the opportunities for receiving higher education. But at the heart of VET attractiveness is the question of whether it will lead to a promising career in the labour market for individuals, which is similar to the context of other countries (Billett et al. 2020; Aarkrog 2020; Stalder and Lüthi 2020). In the long run, our findings show strongly that it is not only important to enhance SVSs themselves, but also to optimise the labour market environment for skilled workers, and provide more possibilities for upward mobility.

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# **Relationship between Workload, Job stress, Work Conflict and Workplace Deviant Behaviour in Selected Technical And Vocational Education Training (TVET) Institution.**

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## **Abstract**

This study identified the relationship between workload, work stress and work conflict towards deviance behaviour among vocational instructor in selected technical and vocational education training (TVET) institution. This study applied quantitative approach to identify the relationship between variables. The total of 120 vocational academicians were selected randomly based on Krejcie and Morgan's (1970) table. The descriptive result shows level of workload, work stress, work conflict and level of deviant behaviour among instructors were in moderate. While the Pearson test results show a positive significant relationship between the variables. This study also proved that workload is the dominant factor influencing deviant behaviour of instructors. Overall, this study has identified the presence of instructors' deviant behaviour due to work factors such as excessive workload, conflict due to failure to control emotions and to face prolonged work stress. TVET management should take appropriate action on problem solving deviant behaviour in order to create a healthy work environment and harmony.

**Keywords:** Deviant behaviour, job stress, work conflict, workload, instructors.

## Introduction

Deviant behaviour in the legal context refers to negative behaviours such as unproductive behaviour, antisocial behaviour, theft, misconduct, non-compliance, abnormal behaviour and aggression in the workplace. The impact of deviant behaviour will be detrimental as well as tarnish the image of the organization. When an employee violates a policy or rule that could affect the well-being of the organization or employees, it is assumed that deviant behaviour toward the employee has occurred. Employee malpractice behaviours in organizations have negative effects at all levels of the organization (Robinson & Bennett, 1995; Robinson & Coccia, 1998; Greenberg & Barling, 1996; Peterson, 2002; Christian & Ellis, 2011).

According to Appelbaum et al. (2005), deviant behaviours in the workplace have contributed to numerous losses and can damage the workplace atmosphere. Theft, fraud, vandalism, sabotage, absenteeism, spreading rumours, aggression, and sexual harassment are examples of deviant workplace behaviour. Such behaviour can endanger the well-being of an organization (Bennett & Robinson, 2003), and also be an economic threat to the organization if not curbed. Harris and Ogbonna (2006), found that the presence of deviant behaviour in the workplace in the United States causes an estimated organizational loss of up to \$ 200 billion annually. The problem of deviant behaviour is not only prominent in the private sector but also the public sector such as the TVET instructors is no exception. Cases of deviant reports have increased for example, instructors leave work early and take long breaks. TVET instructors are always faced with different and unpredictable work pressures (Goma, 2018) .

## Literature Research

### *Deviant Behaviour Model*

Robinson and Bennett (1995) have introduced a model of deviant behaviour that includes four types of deviant, namely, (i) production deviant, (ii) property deviant, (iii) political deviant and (iv) personal aggression. Four types of deviation indicate that deviant behaviour will change from one dimension to another. For example, from minor deviant behaviours, prolonged rudeness leads to aggressive stimuli that will result in the occurrence of disciplinary problems such as absenteeism, fights, cheating as well as absenteeism.

### *Factors that affect deviant behaviour*

#### *a. Workload*

A study in Nigeria on 356 faculty members of 13 public universities aimed to identify the extent to which workload factors influence deviant behaviour. The results of the study have supported the hypothesis that explains the relationship between workload and deviant behaviour. The results of the Pearson Test show that faculty members agree that workload and work stress factors are the main causes of deviation among faculty members (Adeoti et al., 2019). A study was conducted on sales representatives to find out the status of complaints related to deviant behavior in the workplace. In this study, it was found that as many as 40 percent of the respondents admitted that they had been involved in the problem of deviation in the workplace. The main reason for the existence of this deviation problem among salespeople is due to the factor of increasing workload (Darrat et al., 2010).

*b. Pressure from work*

Preliminary studies conducted by Glisson and Durick (1988) proved that an unhealthy work environment will increase employee emotions that will end in violence in the organization. In the study of Adekanmbi and Ukpere (2019), it was found that stress has a statistically significant positive relationship with deviant behaviour in the workplace in the Nigerian banking industry with a value ( $r = .422$ ;  $p < .01$ ). The work stress among 600 banking officers led to the occurrence of a widespread rate of increase in workplace deviant behavioural activities in Nigerian banking. A study by Mazni and Roziyah (2011) was conducted on 492 respondents in the public sector. This research was to examine the extent to which work stress influences deviant behaviour. The results of the study found that work stress causes work deviation in the organization

*c. The Role of Conflict*

An early study of Thomas (1976) found that the role of work conflict is a situation in which one particular party ignores or contradicts the opinion of another party in employment issues between individuals or groups. For example, discrepancies in opinion while handling a task can create a situation of dissatisfaction and unpleasantness. The study conducted by Arina et al. (2019) over 150 salespeople have identified a relationship between work conflict and deviant behaviour. The results show that there is a significant relationship between the two variables.

*Methods and study area*

The study was conducted in 3 selected private vocational institutions in Klang Valley. The design of this study is based on a quantitative approach. The general objective of this study was to identify the relationships between the variables. Each study variable can be measured using relevant research instruments (Ehsan et al. 2015). The research instrument in this study was adapted from the instrument used in the previous study.

For example, the study instrument of deviant behaviour and the role of work conflict was adapted from Rizzo et al. (1970).

This study uses descriptive statistics to analyse the findings of the study. Descriptive statistics were used to elucidate the demographic profile of the respondents and answer the first objective of the study regarding the level of each construct. Percentages, frequencies and means were used to determine the level of each construct stated as well as to explain the demographic profile of the respondents. Whereas correlation statistics were used to answer the relationship between constructs. Regression statistics were used to answer the objective related effect of the relationship between the variables. This study analysed the data using IBM SPSS version 24 software.

## Results of the study and Discussion

### *Descriptive Analysis*

The results of this analysis showed that the level of deviant behaviour among instructors was moderate where the mean value = 2.93 and standard deviation = 0.72. These results show that the TVET is still not safe from the issue of work irregularities. The moderate level of deviant behaviour indicates that there are still symptoms of misconduct such as corruption, unknown polygamy, drugs, online gambling, absenteeism, and delay in the TVET institutions. Meanwhile, statistical descriptive analysis for workload levels was at mean value = 3.46 and standard deviation = .80, indicating level of workload is high. In this study, the main reason for the heavy workload was due to working bureaucratic setting and completing administration task despite teaching load.

### *Correlation Analysis*

Correlation analysis in this study was conducted to answer the third objective of the study which is to identify the relationship between workload factors, work stress and the role of work conflict. Furthermore, this analysis was conducted to examine whether there is a significant relationship or not between the dependent variable that is workload (hypothesis 1), work stress (hypothesis 2), the role of work conflict (hypothesis 3), with the dependent variable that is deviant behaviour based on the significance level is  $<0.05$ . Researchers conducted the Normality test to ensure that the data distribution was parametric in nature as it was a key assumption for using the Pearson test. Normality test results found that the values of Skewness and Kurtosis are within the specified range of Skewness (-2 to 2) and Kurtosis (-7 to 7).

**Table 1: Correlation between independent and dependent variables**

<b>Variables</b>	<b>r</b>	<b>Sig</b>
Workload	.585 **	.000
Pressure from work	.543 **	.000
The role of work conflict	.408	.000

\*\* Correlation is significant at 0.01 level (2-tailed)

A significant value less than 0.05 (alpha) indicates the existence of a significant relationship between the two variables. Based on the table below there are 3 independent variables that have a significant value less than 0.05. Pearson correlation test analysis showed a significant relationship with workload with deviant behaviour ( $r = .585$ ,  $p < 0.05$ ). The results of Pearson correlation study in Table 4.6 show the existence of a significant positive relationship between work stress and deviant behaviour of instructors that is with the value ( $r = .543$ ,  $p < 0.05$ ). The results of the subsequent Pearson correlation study for the role of work conflict there was a significant relationship with deviant behaviour ( $r = .408$ ,  $p < 0.05$ ).

The findings of this study were found to support previous studies that workload provided a positive and significant relationship to deviant behavior. This directly supports Affective Event Theory (AET) by Weiss and Cropanzano (1996) it says there is a relationship between workload and the occurrence of deviant behavior in organizations. The results of this study are in line with a research study conducted by Fajar Ari Nugraha (2020) which consists of a sample size of 105 special police personnel in Malaysia Institution II B Tenggara community. The findings of the study showed the existence of a positive relationship with a value of  $r = 0.181$  and a significant value of  $p < 0.05$ . Furthermore, a study conducted on 356 faculty members of 13 public universities in Nigeria by Adeoti et al. (2019) reported there was a positive relationship between workload and interpersonal deviation and between work stress and interpersonal deviation.

In this study, it was found that there is a significant positive relationship between work stress and deviant behavior among TVET instructors. The results of this study are in line with the results of a study by Omar et al. (2011) on 162 subjects working as civil servants in Malaysia. The study of Omar et al. (2011) also showed a positive and significant relationship between work stress and deviant behavior in the workplace with values ( $r = 0.325$ ,  $p < 0.05$ ).

The findings of this study have proven the existence of a positive and significant relationship of the role of work conflict to deviant behavior. Thus, the H3 hypothesis presented is supported. The findings of this study are also in line with

the study conducted by Arina et al. (2019) on 150 three-year salesmen of corporate consumer goods in Surabaya Indonesia have identified a relationship between work conflict and deviant behavior. The results show that the existence of an increase in work conflict can cause tension among employees. The findings of this study are in line with the study conducted by Fida et al. (2014) on 1147 workers in Italy. Studies have found that employees who have emotional problems as well as confusion at work are more likely to make mistakes while performing tasks.

### *Regression Analysis*

This test answers the fourth research question which is to determine the predictor factors that influence deviant behaviour. The results of the multiple regression analysis can be seen from Table 2 below.

**Table 2: Regression analysis**

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig
1	(Constant)	.749	.261		2,873	.005
	Work load	.351	.077	.371	4,533	.000
	Pressure from work	.281	.072	.312	3,918	.000
	The role of work conflict	.160	.075	.075	2,140	.034

The results of the study in Table 2, mean that all three independent variables namely workload, work stress and the role of work conflict influence deviant behaviour. Among the three predictor factors, it was found that the workload factor was the most influential at 35 percent. In parallel with this study, a study was conducted by Radzali et al. (2013) a total of 261 civil servant respondents in the Prime Minister's Department found that deviant behaviour was influenced by workload, job stress as well as role conflict. This means that when an employee is burdened with a heavy workload. The results of this regression test are similar to the study conducted by Dewangan and Verghese (2018) where workload influences deviant behaviour in the workplace.

### **Conclusion**

The results of this study prove that workload is a perfect predictor of behaviour in a TVET setting. Based on empirical studies, it has been proven that the workload should not be taken lightly by all parties. The impact of workload will not only affect the



personal psychology and physiology of the instructor but will also tarnish the image of the institution negatively. Instructors often face traumatic incidents in their work. This study has also identified that conflict role factors can influence the existence of deviant behaviours in the work environment. This is due to the increase in subjects assigned to a instructor is higher as well as the pressure to produce excellence service. Overall this study clearly indicating that reducing workplace conflict, workload and stress could reduce the occurrence of workplace deviant among TVET instructors

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Relationship between Workload, Job stress, Work Conflict and Workplace Deviant Behaviour  
in Selected Technical And Vocational Education Training (TVET) Institution.

**BACK**

# **The Use of Human Asset Specificity to Enhance The Relationship between Human Capital and Innovation Performance**

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## **Abstract**

This study examines the human capital (HC) in bottle drinking industries in Indonesia, impacting the innovation performance via mediator variables. Applying the theory of resource-based view (RBV) and theory of relational exchange (RET) to explore these links, several hypotheses are constructed regarding human asset specificity (HAS) and joint learning capacity (JLC) as a mediator variable. The research is examined by the partial least square-structural equation model (PLS-SEM), and 143 manufactures in Indonesia gather the data sample. The empirical findings show that HAS and JLC mediate HC on innovation performance. Theoretically, the study reveals that complements between RBV and RET create synergy relation human capital on innovation performance through some mediator variables.

**Keywords:** *Human Capital, Human Asset Specificity, Innovation Performance, Joint Learning Capacity.*

## **1. Introduction**

With the coming of the knowledge economy, the condition for industries' existence and development has endured in turmoil variation, constructing intellectual capital (IC) performs as an essential part in realizing greater performance (Serenko

& Bontis, 2013). IC is essential to reveal the influence of IC such as human capital (skills, proficiency, competencies, and expertise of employees) in the increasing innovation performance. Human capital development is sustained by companies' abilities to admit up-to-date technologies, direct innovation and entrepreneurship, boost worker competence, and a firm's performance (Ayentimi, 2018). It is constructed as knowledge assets and carriers that firms utilize to maintain competitive advantage (Asiaei et al., 2018). On the other side, knowledge and smartness are gradually fundamental in innovation accomplishments; on the contrary, investment and capital expended on innovation deeds reinforce the knowledge and intellect of firms. Companies with the same degree of human capital could not obtain equal advantages because they vary in their capability of identifying, capturing, and reorganizing such assets (Hsu & Wang, 2012).

Moreover, the firms linked with the manufacturing, particularly the bottled drinking industry in Indonesia, require considering innovation as a vital strategy in the present period to persist the completely competitive and knowledge-established business situation (Camisón et al., 2016). To face the dynamic environment and progress, they require recognizing such variations and the main aspects of organizational innovation and offering the most proper solutions to the alters (García-Villaverde et al., 2017). Thus, because of the intense rivalry, the complicated, dynamic, and fluctuating circumstances, firms are determined on their knowledge and information-regarded skill for their existence and development (Prajogo & Oke, 2016). It is regarded as defiance for industries to build ways to recognize sources of knowledge appropriately and accumulate and acquire the knowledge improved in their firms and distribute it among people through the corporation (Masadeh et al., 2017). Finally, these strives meet the research gaps by analyzing the influence of human capital on the innovation performance of bottled drinking-water industries in Indonesia.

To fulfill the gaps, portrayed by the theory of resource-based view (Barney, 1991) and relational exchange theory (Heide & John, 1995), the authors construct and empirically prove a context propositioning which human asset specificity and collective learning capacity mediate the relationship between human capital (HC), and innovation performance. If properly employed, HC may increase the collective learning capacity through accelerating the development for knowledge-making and acquiring the supplier's knowledge by the human asset specificity, which directly improves the innovative product in firms (Schiuma & Lerro, 2008). The joint learning capacity is the capability of the suppliers to reciprocally foster mainly structural organization and interaction ways that incorporate the affiliates' knowledge and commit it in the perspective of their connection (Fang & Zou, 2010). Thus, human asset specificity possibly will boost the encouragement for suppliers to exchange information and knowledge through their technical experts (e.g., blowing bottle machines). The expert teams from suppliers share the technical knowledge toward

employees at the manufacturer on how to improve the blowing result of the bottle machine, which is compatible with the filling machine. Vocational training (VT) through human asset specificity helps the manufacturer respond to the new orders and turn into more creative and inventive to foster and propose new expertise, skills, and capabilities. Appropriate the high-tech alters and globalization, like the learning ability or innovation (Deaconu et al., 2018). The research aims to scrutinize the impact of human asset specificity and joint learning capacity as mediators for human capital to enhance innovation performance in the bottled drinking industry in Indonesia.

## **2. Literature Review**

### **2.1 Relationship between Human Capital and Innovation Performance**

Human capital is the degree of creativeness, knowledge, and notion improvement abilities inhabiting within and applied by employees in firms (Subramaniam & Youndt, 2005). The critical part is linked with the firm's capability for achievement and the innovative behaviors of the workers (Curran & Walsworth, 2014). In both industry and educational work, it is essential to ensure the human aspect, as it intends productive and valuable notions and exchanged knowledge, throughout supervisors have an open manner on innovative performances (Grissemann et al., 2013). Then, the human aspect is the receiver, initiator, and valuable guard of knowledge assets which a firm can employ to generate worthy innovations and it performs a specifically essential part in confirming the achievement of firms linked to the friendliness manufacturing (Kumar et al., 2008).

A firm's knowledge principally exists in its human capital, and innovations are inclined to originate from such knowledge (Subramaniam & Youndt 2005). Then, while companies construct human capital consisting of knowledge and abilities linking to creativeness and improvement of new notions, it causes an innovation benefit for the organizations. Creativity abilities, access cause it, and revelation to varied and new knowledge provide the occurring and establishing knowledge that enhances the possibility of producing new ideas and innovations (Subramaniam & Youndt, 2005). Henceforth, we hypothesize:

H1: Human Capital is positively influence to innovation performance.

### **2.2 Mediation Effect of Human Asset Specificity Relationship on the relation between Human Capital and Innovation Performance**

Human asset specificity (HAS) simultaneously generates a significant impact termed “value conception impact” as it may encourage collaboration from the outlooks of the resource-based view and relational exchange theory (RET). The positive impact occurs because collaboration is essential to earn the prospective quasi-rent and preserve the sources. Knowledge of a firm and workers is built over a long period. While encountered with the intense technological revolution, it is hard to preserve the actual worth and efficacy of the knowledge. As an outcome, the firm and employees should acquire and build new knowledge construction to respond to new technological circumstances.

RET suggests that HAS is a type of relation-specific asset, indicating the want to empower in a continued connection and enhance joint actions and deal value (Dyer & Singh, 1998). Higher specificity generates particular knowledge, cultural standards, and habits that are hard to reproduce, improving internal effectiveness and synchronization (De Vita et al., 2010). HAS can encourage belief, assurance, social implanted, mutuality, and altruism, producing social capital (Huang & Huang, 2019). For instance, human capital (HC) intensifies as employees form experience toiling jointly and gather specified information, communication, and expertise, allowing them to interact efficiently and efficiently. In the bottled drinking industry, some suppliers put the blowing machine for creating bottles by preform material in manufacturer where they deliver the technical expertise to give vocational training for the employee. HC can enhance the excellent quality and reduce the product development phase also boost innovation performance. Thus, HAS has the function of value creation (Dyer & Singh, 1998). Consequently, the relationship between human capital and innovation performance reinforces with intensifying HAS regarded on RET. Hence, we hypothesize:

H2: HAS mediates the relationship between the human capital and innovation performance.

### **2.3 Mediation Effect of Joint Learning Capacity Relationship on the relation between Human Capital and Innovation Performance**

The joint learning capacity (JLC) is the main aim for company relationships (, and it has a strong link with innovation performance (Fang & Zou, 2010). Suppliers must construct intense relationships with their manufacturers and construct new definite knowledge, which increases the shared value of their balancing knowledge and competencies over the long run (Larsson et al., 1998). Joint learning is a mutual association because it can gradually deliver new knowledge builds for both participants to react to dynamic conditions (Fang & Zou, 2010). The associates can reciprocally construct complex structural infrastructure and interaction channels that incorporate the affiliates' knowledge and commit it to the scope of their connection. For

instance, by involving in new product development schemes, suppliers can mix their manufacturing familiarity with the drinking bottle industry's understanding of using the blowing machine. They enable the development of products, training vocational employees, skills, and procedure routines that advantage both participants. This type of new connection-specific knowledge allows a supplier and its manufacturers to adopt more economically to create product innovation, which mitigates market dynamics.

Suppliers involve in collaborative and cooperative learning to create particular knowledge, practices, regulations, and procedures through training the employees' manufacture how to operate the blowing machine and automatically integrated to filling machine bottle that benefits both parties. Portraying the significance of co-creation prospects, joint learning is mutual development of learning, including co-evaluation by both relational groups, and it can form new knowledge and notions. Thus, this JLC can cope with the drawback of disparate knowledge sources across the improvement of joint comprehending amid the two groups. This can deliver cooperative benefits among the parties. It is essential to state which joint learning acquires circumstance while the two parties dynamically produce, enhance, and improve synergies by mixing their sources (Fang & Zou, 2010). An established relationship has the belief obliged to encourage the distributing of sources and joint formation of knowledge. Building trustworthy commitments through joint learning has been linked with better collaboration and mutual goods design (Charterina et al., 2016). By deepening communications between the manufacturer and supplier, these interactive meetings enable the exchange and construction of new knowledge (Kohtamäki & Bournakis, 2012). More particularly, JLC allows suppliers via their technical experts to create relation-specific knowledge about the blowing machine, which delivers learning benefits and improves innovation performance. Hence, we hypothesize:

H3: Joint learning capacity mediates the relationship between the human capital and innovation performance.

### **3. Methodology**

#### **3.1 Measurement development**

This study constructed and embraced variable determines adopted from the existent literature. Five items measure human Capital that employees in our industry are highly skilled, experts in particular jobs, create a good solution, well-educated, and best people in our industry (Mubarik et al., 2021). Human asset specificity is measured by four items that our supplier has put technical expert to achieve efficiency production, invested trainer of blowing machine to train our employee, committed

to send our employee for a training center in their supplier factory, and committed substantial investment in employee training for the manufacturer (Yen & Hung, 2013). Four items measure joint learning capacity that our relationship with the leading supplier has created robust capacity, organizational processes to improve new knowledge collections, efficacy knowledge interaction among two parties, and built the strong capability to integrate new structural information systems (Lin et al., 2017). Innovation performance is measured by four items that our firm has created new products, created new processes, enhanced our current products, and improved our current processes (Khraishi et al., 2020). Respondents were requested to mark all items applying a five-point Likert scale (1 “strongly disagree” and 5 “strongly agree”).

### **3.2 Sample and Data Gathering**

Data were collected by an archive of the Association of Bottled Water Industry in Indonesia. The unit of analysis is at the firm level. Chief executive directors, plant executives, and senior managers were pointed as respondents. At a randomly chosen manufacturing industry sample, we have employed a list of 235 executives with more than 150 employees and 1 USD million in annual sales. The data has been taken by e-mail. One hundred forty-three accomplished surveys, indicating 60.85%, were recaptured linked to other prior management studies.

## **4. Data analysis and results**

To recognize human capital's direct and indirect impact on innovation performance with the mediating influence of human asset specificity and joint learning capacity in the bottled drinking industry. PLS-SEM (Partial Least Square-Structural Equation Modelling) method was utilized to assess the whole measurement model.

### **4.1. Measurement model**

Item indicators have been confirmed by convergent validity and discriminant validity. Assessing convergent validity by evaluating loading factor surpassing 0.7, composite reliabilities surpassing 0.8, and the average extracted variance (AVE) must be greater than 0.5 for all constructs. All rates in the model are greater than 0.7. A discriminant validity analysis is confirmed where the value of HTMT is lesser than 0.90. Finally, the measurement of the goodness-of-fit model was because of the SRMR rate < 0.08 and NFI rate > 0.9.

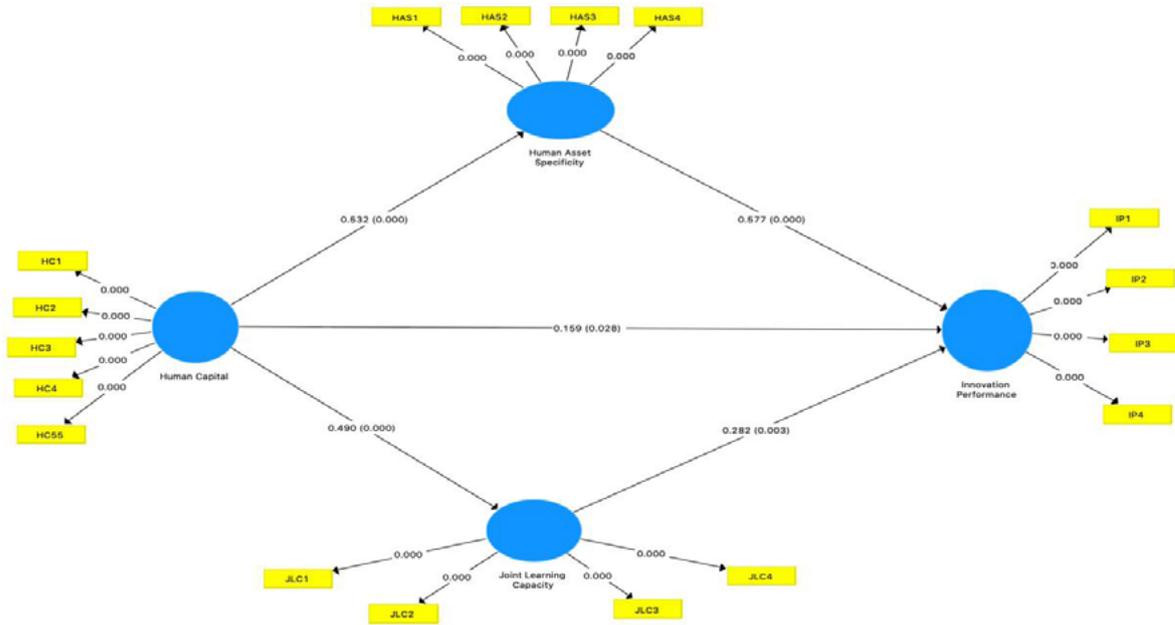


Figure 1. Results of path analysis

## 4.2 Results

The result shows that human capital significantly affects innovation performance ( $\beta = 0.159$ ,  $p < 0.05$ ). This finding is consistent with prior research that harnessing human capital includes altering structural knowledge within recognizing new knowledge to improve innovations (Prajogo & Oke, 2016). Employees with high degrees of knowledge, skills, and professional proficiencies perform an essential part in the innovation of performance firms, respond to a dynamic environment (Hidalgo-Penate et al., 2020).

The result shows that the indirect relationship of human capital on innovation performance mediated by human asset specificity was positively significant ( $\beta = 0.307$ ,  $p < 0.01$ ). The good competency and high-skilled of employees speedily absorb knowledge from technical expertise delivered by suppliers (Wu, 2020). Thus, the suppliers put the technical expertise to give vocational training for the employee at manufacturer how to use the blowing machine that enriches the product quality, reduces the product development phase, and enhances innovation performance (Khraishi et al., 2020). This finding shows that HAS is a full mediator and fulfills the gap between human capital and innovation performance.

The result shows that the indirect relationship of human capital on innovation performance mediated by joint learning capacity (JLC) was positively significant ( $\beta = 0.138$ ,  $p < 0.05$ ). Expert and well-educated employees make greater cooperation and collaborative product design through steadfast commitments via joint learning

(Charterina et al., 2016; Ariadi et al., 2021). By enriching interactions between the manufacturer and supplier, joint learning capacity enables suppliers via their technical experts to create relation-specific knowledge about the blowing machine that enables learning advantages and enhances innovation performance (Fang & Zou, 2010). This finding shows that JLC is a partial mediator and fulfills the gap between human capital and innovation performance.

## 5. Conclusion

The outcome of this research proposes the role of human capital as leverages of innovation performance in the bottle drinking industry in Indonesia. The study's results reveal that human asset specificity and joint learning capacity (JLC) as mediators link human capital and innovation performances. The study also emphasizes which the HAS is an influential intermediary compared to the other mediator for enhancing the influence of human capital towards innovation performance. Theoretically, this study creates the synchronization between the theory of RBV and RET to link human capital to leverage innovation performances through HAS and JLC in this industry.

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The Use of Human Asset Specificity to Enhance The Relationship between Human Capital and  
Innovation Performance

**BACK**

# Agile Learning for work-skilled students oriented

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## Abstract

The industry necessitates graduates with skill and experience in providing to business in an inventive approach. Moreover, the industry challenges obtaining such competent laborers due to training incompatibility because there are weak connections between educational organizations and industry. The learning schemes should be improved, acknowledging these experienced employees as lacking competencies at an academic degree outside of universities. Then the agile learning is required to create responsive, adaptative, and collaborative processes to accomplish successful information system (IS) projects. Sixty-four students participated in IS projects and were categorized into eight project groups, each of which comprised eight project participants that collaborated with the industry. The results of the study reveal that agile learning is efficacy to provide media support as well as the domain-specific quality of solutions for the learning project. The integration of agile learning focused on enhancing project improvement that incorporates into project-based learning.

**Keywords:** *agile learning, industry, project-based learning, skill*

## 1. Introduction

Applied Science Universities impact the economic advancement and improvement of a state within the establishment of core, subject-specific courses which emphasize practical and business knowledge providing innovation, new product improvement, and increased competitive business representations (Huggins et al., 2008). As the business situation turns into more international and technological enhancements,

influence how, where. When business dealings are performed, the industry necessitates graduates with skill and experience in providing to business in an inventive approach. Further knowledge and skilled labor in new segments are required. Simultaneously, experience-regarded knowledge befalls essential in resolving complicated problems in substantially interrelated industries.

Mainly, there is a continuing argument worldwide around the deficiency of skillful and practiced laborers in engineering and influencing the industry (Brush et al., 2014). Indeed, those skills are required most and are still extensively discussed, but there is rising consent that university lonely cannot address this competence gap (Casner-Lotto & Barrington, 2006). Moreover, the industry challenges obtaining such competent laborers due to training incompatibility (Leyden, 2008). There are weak connections between educational organizations and industry (Ramlee, 2017). The learning and training method is not generating satisfactory workers needed by the industry (NEAC, 2010). The competent mismatch and lack of skills have encouraged the government to observe the course's appropriateness and practicing schemes that require improvement to realize industrial demands (Fong, 2007). However, the mismatch perseveres due to the lag of curriculum alterations. Inadequate training services and infrastructure in applied science universities cannot attain the latest facilities in the firm. So, incredibly competent, experienced laborers with a vocational practice setting will provide ideal solutions to this emptiness.

Conversely, this process meets major defies firms report that their vocationally skilled workers are not prepared to convene these new obstacles through their practical experience and capabilities because they are deficiency important proficiencies. Then, learning schemes should be improved, acknowledging these experienced employees as lacking competencies at an academic degree outside of universities. The other challenges are also to be faced Indonesian government in efforts to create a skilled workforce following the competencies required by the world of work. In this case, it is the world of business/industrial (DUDI) whose relevance involves two dimensions, namely university and the world of work or society. The problem with the number of unemployed is caused by poor education management or graduates who do not have competence. It has an impact deficiency the workforce is dominated by three areas of expertise: engineering, information technology, and the creative economy.

"Link and Match" program is one policy Department Education and Culture of the Republic of Indonesia that ever existed and was developed to increase the relevance of higher education institutions (HEI) with the needs of the world of work, business, and industry in particular. However, it seems that it takes more maximum effort than the Ministry of Education and Culture in adding the existence of HEI in the field of expertise needed and adapted to the potential and needs of the workforce in the region. This program admits applying this method to manufacturing, emphasizing online learning circumstances to enhance and encourage continuous integration in current

firm structures. Then, this new learning method aims to generate a learning situation that acknowledges students to obtain essential capabilities in their workstation, making an implanted system of studying and toiling also enhancing a vocational training background.

## **2. Literature Review**

### **2.1 Concept of Agile Learning**

An agile learning concept has been formed that benefits from great implementation by agile project management (Komus, 2014). In such a situation, learning goals must be flexible, incremental, and simply adjustable to modifies. It is constructed on the philosophies of problem-based learning (Gautschi & Schumacher, 2012) on the role of the student and a demand-pushed and reflexive viewpoint of the learning instructs that frames on the notions of extensive learning models (Engeström & Sannino, 2017). Mainly, we selected a combination of these two approaches to reach a situation that provides sufficient space for self-prepared studying and knowledge building – pursuing the notions of project-based learning – together with an organizational function. It can direct the students and deliver a methodical context and direct a new knowledge approach. Specifically, project-based learning significantly impacts the problem and workstation-regarded learning atmospheres; meanwhile, it needs real-life defiance to illustrate problem resolution and knowledge interpretation (Steffe & Gale, 1995).

Further, the agile concept has been progressively integrated into Information System courses in university. Lecturers are encouraging agile perform ways and trust which familiarizing learners with agile practices are an efficacy plan for arranging them to meet obstacles in actual work conditions (Scott et al., 2014). The agile approaches are being merged by these modules that are subject matter and the toiling method for learners. The overview of these approaches into knowledge regions other than Information Systems for education intentions is fascinating because they embody cooperative and structural procedures. The procedure across that learners absorb comprehending the agile philosophies is called agile learning.

### **2.2. The learning process**

The digital turn in routine time directs to the occurrence of digital areas for closely each public participant. Digital areas can be known as circumstances in which joining and collaborating via digital instruments with groups is either a requirement or more pleasant (Meyers et al., 2013). Then, the required proficiencies of digital knowledge become more substantial for the labor in the future and must be incorporated in a prospect-concerned with learning context. Agile learning purposes

for integrating firms' information technology infrastructure, such as the learning condition involving project teamwork, cooperative procedures, and instruments. Notably, participants of the learning group are persuaded to record their learning aims on a digital program and organize communication and sharing regarded on the applicable firm instruments (for example, learning management systems, online document exchanging platforms).

Agile learning indicates which students produce content and acquire abilities together with lecturers in a cooperative despite harsh conditions intervened by technology (Royle & Nikolic, 2013). The function of the lecturer is positioned on facilitator and project guidance by a knowledgeable viewpoint. Students get self-guided, team-focused, and independently spirited lifelong students. It ensues in gradual phases and within an iterative procedure that exchanges among periods of studying and performing. In summation, the main aspects of agile learning are:

- Groups of peers with related improvement aims
- Lectures (inside/outside university) to enhance the learning process
- Firm stake owners (accounting, human resource department, production) embodied by a project owner.
- Learning aims that the group categorizes into individual learning targets. The lectures intently direct this procedure, and next to achievement, the project owner will validate the outcomes.
- Performing along with assignments from the existing toiling framework.

### 3. Research Method

This study uses a qualitative method with approach case study research. Case studies are included in descriptive-analytical research, where the research focuses on a particular case that is carefully observed and analyzed. This analysis was carried out on various factors related to the case studied. This study was regarding agile learning to enhance educated workers that industry requirements could absorb. This model is implemented at the company of Tirta Mumbul Jaya Abadi (TMJA) for different departments. TMJA is an industrial manufacturer of bottled water with a network of consumers located in the Bali area. The company requires the development of information systems in each department to improve its business performance.

As the output of a policy, the Link and Match program is a concept of the relationship between educational institutions and the world of work, or in other

words, Link and Match is the relationship between labor suppliers and their users. With this relationship, education as labor suppliers can establish relationships with the business/industry world. With this link and match, an institution, especially Vocational Education, can collaborate with other parties, especially with companies or industries, so that students can do internships at the company. With the Link and Match, vocational education can find out what competencies (skills) are most needed by the world of work and what competencies are most needed by the world of work. Regarding the link and match program, internship students boarded on learning projects with periods varying from four months to six months. Cross-cutting concerns correspondingly adjust the projects' issues to particular practical matters. In this case, learning courses and outside mechanical proficiency were provided by the University of Pendidikan Ganesha, Bali.

The contributors in this research were undergraduate students from the education of information technology degree registered in the module titled 'Project Management Course' at the University of Pendidikan Ganesha, Bali. The experimental test was performed in one semester during the 2020/2021 academic year employing various student samples with similar situations (i.e., lecturer, course project). The main aim of this course is to encourage the acquirement of online collaborative tasks and the application of ICT in studying and expert backgrounds 'capabilities. The project-based learning method fosters students to create an information system (IS) project in small groups when gradually doing learning deeds. The project comprises improving an IS software that is applied to each department in the company.

Sixty-four pupils enrolled in the course during the first semester of the 2020/2021 academic year (48 men, 16 women). The students were categorized into eight project groups, each of which comprised eight project participants. Students created teams based on individual competence. Each group develops information systems for the company of TMJA such as IS of production, IS of the warehouse, IS of accounting, IS of sales, IS of inventory, IS of financial administration, IS of human resource, and IS of maintenance. Every IS project must be integrated with other IS Projects that the agile learning is required to create responsive, adaptative, and collaborative processes to accomplish successful projects. Some approaches were integrated into the project-based practice in turn to enhance the efficiency of joint learning practices. The plans were as comprehends:

1. Work phases (WP), assignment lists, and an instrument for illustrating the roadmap were integrated into the project to assist students in designing the project economically.
2. New parts were intended with specified obligations for handling with the deficiency of team obligation and promise.
3. Assesses and indications were stated at the end of each phase and during the

project via observing meetings and end of WP gatherings to mitigate the deficiency of contemplation and weak interaction.

Agile project management has particular signs which provide learners to for adopting agile approaches to their task processes. From the lecturer's viewpoint, incessant constructive e-feedback was postulated during and at the end of each WP. The lecturer performed as a controller and mediator, assisting learners to enhance their learning method repetitively via the improvement of the IS project. As explained in the learning model, in company evaluate their learning requirements and determines that knowledge already occurred in their team. Vary resources presented the up-to-date learning substance to realize the excellent fit between complication and learner requirements:

- peers with the group project,
- resources from the firm (guideline papers, standard operating procedure),
- external resources from the internet (e.g., online tutorials, Massive Open Online Courses),
- practical professionals from external (e.g., experts programming language and guest lecturer).

#### **4. Results**

IS projects were appraised via interviewing senior management, project owners, lecturers, and analysis of group worksheets and demonstrations. Evaluation outcomes were assessed by four criteria that were definition, design, development, and presentation. The concerns in the learning development improved or obstructed learning, how the various performers (project owner, group, and lectures) collaborated, how satisfactory the group was able to manage and synchronize, the efficacy of the supplementing media support as well as the domain-specific quality of resolutions for the learning project. In summation, the outcomes are very boosting in most factors, but reveal exact defies for a long-period realization of the notion. The analysis of the evaluation indicated to the succeeding suppositions:

- Students were commonly very inspired and revealed a good team atmosphere. Learning from individuals to others and as a group toiled efficiently and productively.
- Learning with the actual performing scope is kindly respected. This practice does not only increase motivation but also relieves allocation into other assignments. In specific, approaches to tackling new drawbacks can be obtained.

- An issue for many members is that they are deficient in methods of self-guided learning. Since the agile learning context depends on self-guided learning, an extended interim cycle would have been essential to acknowledge members to become acquainted with this new method of learning progressively.
- The agile learning method delivers an intensive and work-inserted learning setting as contrasting to conventional training modules. Admits for a customized-created capability improvement is purposed at particular prospect work necessities with firm policies.
- Mainly, the realization of agile learning in firm structures establishes some defies that involve but are not limited to the subsequent statements:
- With a diverse group from various departments and various qualifications, it is critical to realize a project assignment that involves all members proportionately.
- Actual work duties entail great solutions when a learning development continuously requires more levels of liberty (generate failures in output). Thus, project owners must be persuaded to be composure and tolerant diversions. Definitively, a learning assignment aims not primarily to deliver a sound solution but to obtain the skill to answer a particular problem.
- Since learning issues are customized to the particular requirements of the firm and students, learning subjects are inclined to become very precise in some aspects. It creates significant to get the appropriate resources and professionals to deliver support toward a new domain.

## **5. Conclusion**

Specifically, participants of the learning group are fostered to detail their learning outcomes on an IT platform. The integration of agile learning focused on enhancing project improvement that incorporates into project-based learning. It enables project management that the responsibility of the lecture is vital for spreading the value of the procedure itself and for assisting students to fit their attempts to the necessitated assignments. The agile concept to the learning background fulfills industry requirements. Thus, the lecturers and students can adjust to modifiers to enable learning and improve marketable capabilities. For this intention, project-based learning is mainly boosted with continuous responsiveness to practical distinction and good schemes but encouraging solutions. So, implementing agile approaches to instructional transforms from knowledge conveying to knowledge created by learning models and project- based learning techniques. The lecturer performs as a supervisor and enabler, aiding students to enhance their learning activity rehearsal within the improvement projects.

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# **DEVELOPMENT OF THE INTERNET OF THINGS (IOT)-BASED ROBOT TRAINER AS A LEARNING MEDIA IN REMOTE ROBOTIC PRACTICE**

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## **ABSTRACT**

Vocational education is higher education that must be in harmony with the world of work. The development of the world of work today is following the demands of the Industrial Revolution 4.0, namely the *Internet of Things (IoT)*, *big data*, *augmented reality*, *cyber security*, *artificial intelligence*, *additive manufacturing*, *simulation*, *system integration*, and *cloud computing*. Prosser's theory says that effective vocational education can only be provided which training tasks are carried out in the same way as tools and machines in the specified workplace, so that learning carried out in vocational education must adapt to the development of industry 4.0. The research aims to establish IoT-based robotics learning media and produce valid, practical, and effective robotics trainer media. The research method used is Research and Development with a 4D development model theory. The model elaborates on defining, designing, developing, and distributing. The definition is based on the learning achievement of practicum material by the competence of robotics practice. The population in this study were students of the Engineering Faculty of Universitas Negeri Makassar. The research samples needed include a *one-to-one* trial consisting of 3 people, a small group trial of 5 people, and a large group trial of 19 people. The model design uses a nonequivalent quasi-experimental. The research data analysis technique uses descriptive analysis of percentages that describe the development results, validator responses, outcomes of *one-to-one* trials, small group trials, and large group trials. This study uses two expert validators in electronics, microcontrollers, robotics, and artificial intelligence. The results of the validity data analysis stated that the IoT-based robotics learning media had been declared feasible to be used. The results of the effectiveness of media products based on the pretest and posttest

results show that the average value of students before using the media trainer is 43.8, increasing to 87.1 after using the IoT-based robotics trainer media. The research data analysis and discussion conclude that the IoT-based robotics learning media developed are declared valid/feasible, practical, and effective in its use.

Keywords: *Learning Media, Robotics Trainer, Internet of Things*

## PRELIMINARY

Industry 4.0 is marked by increased connectivity and interaction, digital systems, artificial intelligence, and virtual. With the increasing boundaries between humans, machines, and other resources, information and communication technology certainly impact various sectors of life. In the 4.0 industrial revolution, nine technologies will become the main pillars to develop an ordinary industry towards a digital-ready industry. They are the internet of things (IoT), big data, augmented reality, cyber security, artificial intelligence, additive manufacturing, simulation, system integration, and cloud computing. The era of the industrial revolution 4.0 is getting a fast response worldwide, including in Indonesia. In current learning, education 4.0 is known, a general statement used by educational theorists to describe various ways to integrate technology, both physically and indirectly, into knowledge. At the beginning of this century, education improved itself to improve quality through the Industrial Revolution 4.0. There have been many pieces of training that discuss education 4.0. However, there are still many educators who have difficulty operating technology to support learning in its implementation. Supposedly, education 4.0 requires educational personnel who update themselves both in the economy, the development of education 4.0, and the development of technology and media used in learning.

Learning today requires harmony between humans and information technology to find solutions that can solve various problems and create creative and innovative opportunities to improve life sectors. Things like this require teachers to inevitably learn technology to transfer their knowledge through online teaching and learning activities. Educators and students must also understand the use of technology, which is social media, and all aspects that support the continuity of teaching and learning activities by utilizing the *internet of things* technology in learning.

The rapid development of the Internet of Things (IoT) makes university people have to train their students to be better prepared to advance and implement industry 4.0. Therefore, to improve student understanding, a tool is needed in an *internet*

*of things* (IoT) robot trainer learning media as a learning medium in vocational/vocational education.

Vocational education is an education to develop or move the activity economics. Because vocational education is designed to meet the needs of market work, this will provide positive donations for the industries that produce valuable goods and commodities. The collective of productive work capable of producing the worthed goods will move the economy wheel, affecting the growth of the national economy. Vocational education is education for the world of work (education for vocations or education for occupations). Prosser's theory says that effective vocational education can only be provided where training tasks are carried out in the same way that tools and machines are prescribed in the workplace. One of the tools that support learning is learning media.

Learning media is an essential component in supporting the learning process. Learning media will make it easier for lecturers to deliver learning materials, and students will find it easier to understand. This learning media can be reproduced or produced to allow the lecturers to apply it to the students. Learning media on the market tend to be very general, so they are less supportive for students in the learning process. In addition, students do not yet have a module or job set of work steps in the teaching and learning process of robotics practice courses.

Based on the background of the problems that have been stated above, the development of learning media for robotics practice courses is considered necessary because related problems that the author can identify are: 1) An urgent need for lecturers and students for robotics practice course learning media; 2) Limited media for robotics practices that are relevant to industry needs; 3) Learning the practice of robotics requires learning media that are by the characteristics of students; 4) Charles Prosser's theory which says that learning will be effective if it is carried out specifically and directly on the problem by following the existing reflections in the industry.

## **Research methods**

The type of research used is *Research and Development (R&D)* . The research and development method is used to produce products and test products' validity, practicality, and effectiveness. This research will be conducted using 4D Model development, namely (1) definition, (2) planning, (3) development, (4) deployment. This research is expected to produce learning device products in a valid, practical, and effective IoT-based robotics system trainer media.

The population and sample in this study were students of the Faculty of Engineering, Makassar State University. Some of the research samples needed include

a *one-to-one* trial consisting of 3 (three) people, a small group trial of 5 (five) people, and a field trial of 19 people. So this research material is an IoT-based robotics trainer media. This trainer contains controls and *interfaces for* Arduino Uno and MCU nodes such as arm, line follower, obstacle course, fire, flying, and remote control, along with the additional devices for connection and control of the robot. This trainer was developed by combining all devices into one integrated board to produce a valid and practical media trainer.

Learning media is made based on the learning achievement (CP) of the material taken to be a source of material that follows the needs summarized from the competence of robotics practice. The material covered is material in the practical courses of robotics, robotics systems engineering, and visual programming practice of robotic modules/work steps containing achievement indicators which are then arranged in 1 primary introductory material for robotics and eight modules.

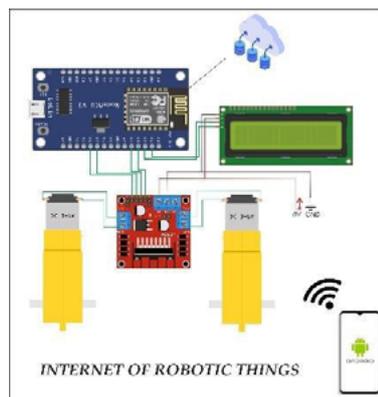


Figure 1. The layout of IoT robotics learning media

Making a circuit using the Corel Draw application by adding a series of components used to manufacture the trainer. Choosing the appropriate piece in making the trainer is the first step so that the placement of features and other devices fits the size of the trainer made previously.



Figure 2. Media Trainer

A trainer is an essential tool in the practicum. Usually, the trainer used in the practicum does not need a program. Still, the trainer made requires a program to be able to communicate. The software that is used to create the language program is Arduino IDE. This software is designed to develop programs using the C language. It is used to define the MCU Node pins that must match the circuit. This pin functions to control the sensor input value and provide output to the device on the trainer. After designing the trainer, the android application is also intended to function remotely with the robot trainer. After the trainer is finished, we will create a learning module or guide module based on the composition of the material.



Figure 3. Trainer Job sheet

The data analysis technique in this research uses descriptive percentage analysis that describes the development results, validator responses, *one-to-one* trial results, small group trials, and large group trials. The types of data analysis are described in more detail to answer each research question as follows:

- Data analysis of the validity of IoT-based robotics learning media

The validity of the IoT-based robotics learning media device is obtained from the validation tests by experts. The validation results are used for descriptive analysis in the form of giving an assessment which is stated in four categories of assessment: very valid, quite valid, less valid, or invalid.

Table 1. Validity category

Validity Criteria	interval	Information
85.01%-100%	Very Valid	It can be used without revision.
70.01%-85.00%	Quite Valid	Usable but needs minor modification.
50.01%-70.00%	Less Valid	It is recommended not to use because it requires significant revision.
01.00%-50.00%	Invalid	It cannot be used.

- Practical data analysis of IoT-based robotics learning media

Practical data analysis was obtained by considering student response data from student response questionnaires to IoT-based robotics trainers. To state the practicality of the learning model, the researcher analyzed descriptively with the modified criteria contained in the following table:

Table 2. Practical criteria

Validity Criteria	interval	Information
85.01%-100%	Very Practical	Very good to use
70.01%-85.00%	Practical enough	Good enough to use
50.01%-70.00%	Less Practical	Not good to use
01.00%-50.00%	Not Practical	Not good to use

- Data analysis of the effectiveness of IoT-based robotics learning media

The data were obtained by performing pretest and posttest to students to measure the success of implementing the IoT-based robotics learning media. They were analyzed descriptively by showing students' scores before and after implementing IoT-based robotics learning media. The category of N-gain scores can be determined based on the N-gain scores, as follows:

Table 3. Categories of N-Gain. scores

Limitation	Category
$g > 0.7$	Tall
$0.3 < g < 0.7$	Currently
$g < 0.3$	Low

## Results and Discussion

The validation stage is a feasibility test for the product being developed. The validation process involves 2 (two) validators as experts in electronics, microcontrollers, robotics and artificial intelligence. The results obtained from this stage state that the IoT-based robotics learning media has been declared feasible in the field. The results of instrument sheet validation in the instructional aspect of 95.84%, the content aspect of 91.67%, the language aspect of 90.63% so that the

total percentage is 92.71% or in the "very valid" category. The results of the media validation of the application and device aspects are 93.75%, the display aspect is 92.5% so that the total percentage is 93.13% or again in the "very valid" category. The results of expert validation of material aspects of content are 96.88%, linguistic aspects are 87.5%, and presentation aspects are 95.83%, so that the total percentage is 93.41% or in the "very valid category." Validation of test questions and response instruments had also been declared suitable for use. The validation results are for the guidance aspect of 100%, the coverage aspect of 83.34%, and the language aspect of 87.5%. The total percentage is 90.28% or in the "very valid" category for response instruments.

Table 4. Results of the validation of IoT-based robotics learning media

No	Aspects/Indicators	Validator	
		First	Second
1	The trainer looks attractive and easy to carry or move	4	4
2	Clarity and determination of the shape of the tool	4	4
3	Media is given a title and description	3	3
4	There are ways to use or care for the media	3	4
5	Overall compatibility of the microcontroller trainer	4	4
Total Score :		18	19
Percentage (%):		90.00%	95.00%
Criteria:		Very Valid	Very Valid

Products that have been declared feasible in field trials are then implemented. The implementation stages are divided into three parts, namely *one-to-one* trials, small group trials, and large group trials. This implementation stage is carried out to determine the practicality and effectiveness of the developed media trainer. Practicality data was obtained by giving questionnaires to students, which contained several aspects of the assessment such as application/device aspects, display aspects, content/content aspects, and language aspects. The questionnaire shows data from each trial process, starting from the one-to-one trial, 88.49%, an increase in the small group trial to 91.82%. So that it can be continued in the final stage, namely the large group trial, which has increased to 92. 71%. From these results, it can be concluded that the IoT-based robotics learning media is in the efficient category for use by students.

Table 4. The results of the recapitulation of the robotics learning media field trial

No	Aspect	Percentage (%)
1	Apps/Devices	91.67
2	Appearance	95.83
3	Content	91.67
4	Language	91.67

The implementation stage also aims to obtain data on the effectiveness of the developed media products. Data collection was carried out using multiple-choice tests given before the use (pretest) and after the use (posttest) of the media. The data obtained showed an N-Gain of 0.77, which was in the high category where the average value of students before use was 43.8 and increased to 87.1 after using a microcontroller-based robotics trainer media. We can conclude this increase in value that the IoT-based robotics learning media has been effective in its use.

Table 4. The results of students' pretest and posttest scores

Respondent	<i>Pretest</i>	<i>Posttest</i>
	<i>Score</i>	<i>Score</i>
R1	43.33	90.00
R2	40.00	86.67
R3	50.00	93.33
R4	40.00	90.00
R5	43.33	76.67
R6	43.33	93.33
R7	33.33	90.00
R8	63.33	80.00
R9	23.33	83.33
R10	33.33	86.67
R11	23.33	90.00
R12	43.33	80.00
R13	66.67	90.00
R14	66.67	96.67
R15	43.33	80.00
R16	43.33	86.67
R17	30.00	76.67
R18	40.00	70.00
R19	33.33	76.67
Highest Score	66.7	96.7
Average	43.8	87.1

## **Conclusion**

Based on the results of research on the development of microcontroller-based robotics trainer media in the Mechatronics Vocational Education study program, FT-UNM, the following conclusions can be drawn:

1. Microcontroller-based robotics trainer media was developed using four stages: (1) Defining of Needs Analysis, analyzing the need for the importance of development. (2) Design, designing a microcontroller-based robotics trainer along with devices related to media. (3) Development, ensuring that the product developed is feasible to be used or tested in the field based on the assessment of experts (4) Dissemination/Implementation, implementing products that have been designed and have been appropriate for students to obtain data on the practicality and effectiveness of using media.
2. The microcontroller-based robotics trainer product has been declared valid or feasible to be used as evidenced by the assessment of two experts with the percentage of eligibility 93.13% for media feasibility and 93.41% for material feasibility. The microcontroller-based robotics trainer product has been declared practical in its use, as evidenced by students' very high assessment data from 3 trials with the practicality percentage of the one-to-one test of 88.49%. As for the small group, 91.82% and finally in the large group obtained 92.71%.
3. The microcontroller-based robotics trainer product has been declared effective as evidenced by the increased learning outcomes from the average score before use (pretest) of 43.8 to the average score after use of 87.1 with an N-Gain of 0.77 in the category high.

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# **Learning Media for Occupational Safety and Health (OSH) in Industrial Practice Courses at the Building Engineering Education Study Program of Sebelas Maret University**

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## **Abstract**

This study aimed to: (a) find out the results of learning media development for good Occupational Safety and Health in the Industrial Practice Course for column and beam structure construction projects, (b) know the feasibility of OSH learning media in the Industrial Practice Course for column and beam structure construction projects. This research was Research and Development (R&D). The activities carried out in developing this product referred to the modification of the development of Borg and Gall by the Pusklijaknov Team (2008: 11), including (a) designing the flowchart of learning media and designing the display of learning media (storyboard), (b) making learning media using articulate storyline software, (c) validating the products by experts in media and materials, (d) conducting limited trials with 10 students, (e) conducting a trial on a larger populations (30 students). The results of this research development were in the form of a folder containing files with HTML5 format (.html) for desktop display which is operated through a browser and additional files with format (.apk) for smartphone display. The feasibility of the learning media for Industrial Practice courses with Occupational Safety and Health (OSH) materials was based on validation from: (a) media expert validators, with a percentage of feasibility of 100% and categorized as very feasible, (b) material expert validator, with a percentage of feasibility of 97% and categorized as very feasible, (c) limited trial, with a 91% feasibility percentage and categorized as very feasible, (d) trial on a larger population, with a percentage of feasibility of 90% and categorized as very feasible. Thus, it was found that the learning media product was very feasible to be used as a learning aid for students and an interesting learning resource in Industrial Practice Courses.

**Keywords:** Learning media, Occupational Safety and Health (OSH), Articulate Storyline

## 1. Introduction

The application of OSH is a must to minimize work risks and accidents because construction is a high risk sector. However, in the construction sector, OSH as a work culture is still not optimal. Awareness of the importance of OSH still needs to be improved because there are still many cases of OSH negligence even though there is a relatively decrease in number.

According to the International Labor Organization, more than 1.8 million work-related deaths occur in the Asia-Pacific region every year. In fact, two-thirds of the world's work-related cases occur in Asia. Overall, around 2.78 million workers die from work-related accidents or health problems each year. Not only that, there are approximately 374 million workers who experience non-fatal accidents annually. According to Employment Social Security (BPJSTK) data, there was a decrease of 33.05% from cases that occurred in 2018 and 2019, namely 114,148 cases in 2018 and 77,295 cases in 2019. Construction workers are often found not wearing any personal protective equipment properly and correctly when working (Prihatiningsih and Sugiyanto, 2010). The results of interviews conducted with relevant agencies in December 2008 showed that only 7% were willing to participate in order to improve the implementation of OSH. Research (Wirahadikusumah & Ferial, 2005 in Prihatiningsih and Sugiyanto, 2010) shows that there was a low level of awareness of OSH in the excavation work in a construction site.

Referring to HW Heinrich's theory of the domino effect, 88% of the main causes of accidents are negligence of workers, while the rest comes from tools and other factors (Ilma Adzim, Herbie, 2013). The introduction of OSH needs to start from the educational environment to help reduce work accident cases. When prospective workers have OSH awareness, it can foster a healthy and safe work environment.

Building Engineering Education is one of the Study Programs at Sebelas Maret University (UNS). As an education oriented to the world of work, it is crucial to teach OSH. OSH is a basis for students to practice, including Industrial Practice. The general purpose of OSH learning is to increase OSH-related knowledge and make students aware of the importance of learning OSH as well as prevent or reduce the number of work accidents. Thus, OSH-related knowledge must be understood and known by students.

According to the data from the questionnaires on student understanding of OSH involving 60 students from class of 2016 to class of 2019, the respondents stated that they had a low level of understanding of OSH. This is because there are no OSH

courses and OSH is only discussed in a time-limited lecture so it is not possible for lecturers deliver the materials optimally. Therefore, it is necessary to support the provision of OSH learning media in the Building Engineering Education Study Program.

As a tool, learning media are used to transfer information from lecturers to students, arouse students' reasoning, interests, tendencies, and desires, which makes learning more effective. Through the use of learning media, the material can be presented by the lecturer in the form of animation and text in audiovisual form, and can be easily replayed, creating fun learning activities.

In the era of the Industrial Revolution 4.0, all activities use technology. The interaction between teachers and students has changed, from face-to-face classroom sessions to online learning. Learning that utilizes information technology and the internet makes it easier for lecturers and students to carry out learning without being bound by space and time. The use of interactive learning media needs to be adapted to the times, so as to make students more enthusiastic and active during learning activities.

Previous studies have shown that the articulate storyline learning media is suitable for use as a learning resource and support for distance learning (Fitriyah Nur Rohmah, 2020). In addition, learning media can help achieve student learning outcomes (Ryan Angga Pratama, 2018).

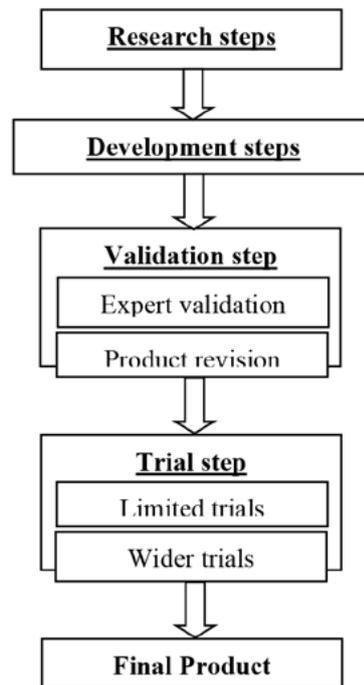
The purpose of this study was to determine the results of developing good OSH learning media and to find out the feasibility of OSH learning media in Industrial Practice Courses for column and beam structure construction projects. The object of this research was the students of Sebelas Maret University (UNS) Building Engineering Education and the subject of this research was a proper occupational safety and health (OSH) learning media. The material used in this research was material related to OSH in the column and beam structure construction project.

It is expected that the results of this study will bring benefits to both students and lecturers. For students, it is expected that this study will make it easier for them to understand the material, increase their understanding of OSH, prepare them for industrial practice, increase their attention and motivation to learn, and increase their interest in learning. Furthermore, for lecturers, this study expectedly makes it easier for them to deliver OSH-related materials, increase their knowledge about student learning characteristics, motivate them to further improve their skills in utilizing learning media, and increase variations in the development of learning media.

## 2. Research Methods

This research was Research and Development (R&D). Research and Development according to Sugiyono (2013: 297) is a research procedure to create a product and test its effectiveness. In the context of education, Research and Development aims to create products that are expected to improve the quality of education.

The method in this study referred to the modification of the Borg and Gall development (Puslitjaknov Team, 2008: 11) which can be seen in Figure 1.



**Figure 1.** The Borg and Gall development procedure (Puslitjaknov Team, 2008: 11)

The data in this study were quantitative and qualitative data. Qualitative data were inputs and comments from a media expert validator, named Lilis Trianingsih, S.Pd. and a material expert named Muhamad Aziz Proklamalatu, ST, MT. Quantitative data were obtained from the questionnaires based on the evaluation of the material and media experts. Each question was given a weight, which is presented in Table 1.

**Table 1.** Questionnaire Score

Response	Weight
Strongly agree	4
Agree	3
Disagree	2
Disagree	1

The percentage of feasibility was calculated or measured from the comparison between the sum of all the quantitative data with the expected score and the percentage obtained (Suharsini Arikunto, 2010:35).

$$\text{Feasibility Percentage (100\%)} = \frac{\text{Observable score}}{\text{Expected score}} \times 100\%$$

Table 2 presents the feasibility classification of product development used in determining the feasibility. In the feasibility assessment, the lowest value was determined, which was less feasible.

**Table 2.** Percentage of eligibility based on Suharsini Arikunto (2010: 208)

Percentage of	Definition
76 - 100%	Very feasible
56 - 75%	Eligible
40 - 55%	Fairly feasible
0 - 39%	Less feasible

The percentage of 76 - 100% was interpreted or defined very feasible. The percentage of 56 – 75% was interpreted or defined as feasible. The percentage of 40 – 55% was interpreted as quite/fairly feasible. Meanwhile the percentage of 0 – 39% was interpreted or defined as less feasible.

### 3. Results

The results of this study were a OSH learning media in HTML5 (Web)-based Industrial Practice Courses by utilizing the Articulate Storyline software. Learning media can later be accessed through the default browser on the laptop, as well as application-based products that can be accessed on smartphones. The learning media developed are presented in Figure 2 and Figure 3.



**Figure 2.** Instructional media intro page

has the university logo and a button to the main page.



**Figure 3.** Main menu page

The main menu page displays the menu buttons “Instructions for use”, “Learning Information”, “Materials”, “Quiz”, “Info”. On the main page, there is an animation with the logo of Universitas Sebelas Maret (UNS), and the “X” button which serves to close the media.

## 4. Discussion

### Preliminary Research

Preliminary research was conducted at the Building Engineering Education Study Program, UNS Surakarta. The research was conducted to identify various needs related to the learning media needed for Industrial Practice courses. OSH needs to be introduced at the initial meeting before students do Industrial Practice. However, it is necessary to design learning media that can be studied by students without time limitation. This is because not much time is allotted for introduction of Industrial Practices by the PI coordinator.

To find out the needs related to learning media, a questionnaire about OSH and interviews with one of the students were performed. The data obtained showed that: (a) All the respondents agreed that an introduction to OSH is needed, (b) all the respondents agreed that there is a need for learning media to deliver an introduction to OSH, (c) almost half of the respondents have seen or experienced work accidents (d) still haven't. The existence of OSH learning media can help provide OSH especially in Industrial Practice courses.

### Product Development

The development of learning media products was carried out in several stages. This stage was carried out after the researchers conducted preliminary research. The product development stages consisted of (a) designing the flowchart of the learning

media and designing the display of the learning media (storyboard). After making the design, the next step was (b) implementing learning media using Articulate Storyline Software, then (c) carrying out product validation by material and media expert validators. It was then followed by (d) revising the product if necessary and (e) conducting a product trial on 10 students. Revisions were made if improvement was deemed to be necessary based on the result of this trial. Then (f) retesting the media to 30 students. The steps taken in the product development referred to simplification by Borg and Gall development procedures.

### **Feasibility Testing**

The feasibility testing stage is to test the developed product. At this stage, the trials consisted of assessments from a media expert validator, a material expert validator, a limited trial, and a trial on a larger population. The media were revised when improvements were needed.

Based on the research that had been carried out, learning media to deliver Occupational Safety and Health (OSH) materials using software Articulate Storyline was produced in the Industrial Practice course. This research was Research and Development (R&D). The media development referred to the simplification of Borg and Gall development procedures.

In the product development process, assessment was needed to create a good learning media. The product evaluation aspects were the writing aspect, the convenience aspect, the display aspect, and the usefulness aspect. The results of the evaluation are shown in Table 3.

Assessment by the media expert was based on the aspects of writing, convenience, and display. The percentage of feasibility obtained from the media expert validator was 100%, and no improvement was needed. The percentage was defined as very feasible to be used as learning media because it was in the range of 76% to 100%.

The next evaluation of the learning media was validation by the material expert. The assessment carried out by the material expert validator covered two aspects, namely accuracy and quality of the material. The material expert validator gave some recommendation for the improvement of the learning media. These recommendations were then used in improving the product. The percentage of feasibility from the material expert validator was 97%. The percentage showed that the materials were very feasible to be used in the learning media because it was in the range of 76% to 100% (Suharsimi Arikunto, 2010: 208).

implementation of the limited trial, 10 students of Building Engineering Education UNS class of 2017 were involved. The limited trial was carried out on July 9, 2021. The purpose of the limited trial was to collect information to be the material for the product improvement. The evaluation of the learning media in the limited trial was based on the aspects of convenience, display, writing, and benefits. The percentage of the feasibility according to the limited trial was 91%. The large percentage of feasibility means that the learning media was very feasible to use because it ranged from 76% to 100% (Suharsimi Arikunto, 2010: 208)

A trial on a larger population was carried out on July 13, 2021 and involved 30 students of Building Engineering Education UNS class of 2017 and class of 2018. The assessment in this trial consisted of four indicators, namely the aspects of convenience, display, writing, and benefits. The percentage of media feasibility

**Table 3.** Complete data on evaluation of learning media

No.	Rating	Indicator					Total score	Expected score	Feasibility Percentage	Appropriateness
		Convenience	Writing	Appearance	Benefits	Material				
1.	Validation by Media Expert	20	20	20			60	60	100%	Very feasible
2.	Validation by Material Expert					58	58	60	97%	Very feasible
3.	Limited trial	19	18	20.9	15		72.90	80	91%	Very feasible
4.	Trial on larger population	18.3	18	20.6	14.9		71.80	80	90%	Very feasible

based on this trial was 90%. The large percentage means that this media is very feasible to be used as learning media because it was in the range of 76% to 100% (Suharsimi Arikunto, 2010: 208).

Thus, overall, based on the media expert validation, material expert validation, limited trial, and trial on a larger population, it was found that the learning media product for the Industrial Practice course with Occupational Safety and Health (OSH) materials using the Articulate Storyline software at the Building Engineering Education Study Program of Sebelas Maret University is very feasible to be used as a learning aid for students and an interesting learning resource in the Industrial Practice Course.

The results of the development of the learning media for the Industrial Practice

course with Occupational Safety and Health (OSH) material were in the form of a folder containing files with the format (.html) for desktop display and additional files with format (.apk) for smartphone display if students do not have laptops. The data memory of this learning media product was 18.7 MB (Mega Bytes) for the desktop display, and 13.4 MB (Mega Bytes) for the smartphone display.

## **5. Conclusion**

According to the research and development, it was concluded that the development of the learning media in the Industrial Practice course containing Occupational Health and Safety (OSH) materials consisted of several stages, namely (a) creating the flowchart of the instructional media as well as the design of the learning media display (storyboard), (b) creating the learning media using articulate storyline software, (c) validating the product by media and material expert validators, (d) revising the product if improvements were needed, (e) testing the media to 10 students. After testing, improvement was made if necessary, (f) retesting the media to 30 students. The product development stages referred to the simplification of the Borg and Gall development procedures. The results of the development of the learning media for the Industrial Practice courses with Occupational Safety and Health (OSH) material were in the form of a folder containing files with the format (.html) for desktop display and additional files with format (.apk) for smartphone display if students do not have laptops. The data memory in this learning media was 18.7 MB (Mega Bytes) for the desktop display, and 13.4 MB (Mega Bytes) for the smartphone display.

The feasibility of the learning media for the Industrial Practice courses with Occupational Safety and Health (OSH) materials based on the evaluation of (a) the media expert validator obtained a 100% feasibility percentage and categorized as very feasible; (b) the material expert validator obtained a 97% feasibility percentage and categorized as very feasible; (c) the limited trial obtained a 91% feasibility percentage and categorized as very feasible; (d) the trial on a larger population obtained a 90% feasibility percentage and categorized as very feasible. Thus, overall, based on the media expert validation, material expert validation, limited trial, and trial on a larger population, it was found that the learning media product for the Industrial Practice courses with Occupational Safety and Health (OSH) materials using the Articulate Storyline software at the Building Engineering Education Study Program of Sebelas Maret University is very feasible for use in learning.

## 6. Limitations and recommendations

The development of this learning media still has shortcomings, including (a) the learning media product has not been tested for its effectiveness in learning activities, (b) the format (.apk) is only limited for students using android, while students who use other operating systems cannot operate the learning media product with the format (.apk), (c) files with (.html) format can only be accessed via a browser on the desktop, while the media should be accessible on either a desktop or smartphone.

Therefore, some recommendations for further development are (a) for future researchers, it is possible to test the effectiveness of the learning media developed in this study to know the effectiveness of the learning media in actual learning processes, (b) for educators, it is expected that they can develop the learning media in this study as an alternative learning media before students carry out Industrial Practice.

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# The Challenges to Adopting Dual Vocational Education and Training System in Indonesia

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## Abstract

**Background-**Recently, Indonesia is trying to take a closer look at the Dual Vocational Training and Education System. Students must learn at two places, at school and the industrial sites in this system: this process synergy education and the industry or local partners. Indonesian government hopes that by applying this system, the industrial sector can absorb the workforce, particularly the younger generations to come. Therefore, it is essential to see Indonesia's challenges in applying the Dual Vocational Training and Education System. Indonesia's Dual VET program is a part of its program to develop its Industrial Priority Sector up to 2035. Dual VET is believed to be a win-win solution for the industry and the labor. However, if a country is willing to use another country's vocational education and training system, they need to adjust to the existing education, social and economic situation.

**Methodology-**This research will be a comparative analytical study collected primary documents from government institutions, including the Ministry of Industry. Secondary documents from analysis report from OECD (Organization for Economic Co-operation and Development), and scholars to meet the feature selection. The current debate has caused an increasing international interest in the dual system in Europe and triggered a trend to transfer such VET systems, or parts of it, to foreign countries particularly in developing countries for instance Malaysia, Vietnam, and Indonesia.

**Findings-** From the analysis report issued by the OECD, three main features can be adopted in Indonesia: VET Research Capacity, Public and Private Funding, An Engagement on The Part of Employers, and Other Social Partners. However, in the application of these three features, the efforts made have not been maximized so that they are still far from the goals to be achieved, more consistent efforts from running out of these programs. It would take a long time and energy from the Indonesian

educational setting to be realized.

## INTRODUCTION

During the uncertain economic condition, the Indonesian Government maintains good macro-economic fundamentals, fiscal policy, and monetary. The Indonesian Government's purposes in developing the financing climate and stimulate foundation development are expected to promote investment in the trade sector (Moccerro, 2008). Through accelerated, the authority centered on three groundbreaking steps for social gap, poverty alleviation, and joblessness. Some actions involve stepping up infrastructure/foundation, the establishment of volume production include human resources and de-bureaucratization. The new generation is awaited to donate the significant and powerful economic extension (Webley & Nyhus, 2013) for Indonesia. Indonesia's current financial condition is overgrowing (Basri & Hill, 2011). However, there is still a lot of unemployment. This is happening due to the different skills needed in the industry than those available in the market (Allen, 2016; Di Gropello et al., 2011).

McKinse, (2012) predicted that the demand for semi-skilled and skilled workers might reach 113 million in 2030. This means that the skills shortage and skills mismatch will worsen throughout Indonesia. To avoid this prediction, in preparing the industrial era 4.0, which involves digital elements in each value chain of its manufacturing processes, it is required to have skilled workers who can adapt to technological developments. Employers in the industrial sector are expected to provide input to the educational curriculum according to technological developments and provide practical facilities and apprenticeships for students and teachers/lecturers to keep up with the latest technological industry developments.

Recently, Indonesia is trying to take a closer look at the Dual Vocational Training and Education System. Students must learn at two places, at school and the industrial sites in this system: this process synergy education and the industry or local partners. Indonesian government hopes that by applying this system, the industrial sector can absorb the workforce, particularly the younger generations to come. Therefore, it is essential to see Indonesia's challenges in applying the Dual Vocational Training and Education System. Indonesia's Dual VET program is a part of its program to develop its Industrial Priority Sector up to 2035. Dual VET is believed to be a win-win solution for the industry and the labor. However, if a country is willing to use another country's vocational education and training system, they need to adjust to the existing education, social and economic situation.

Technical and Vocational Education and Training or TVET in Indonesia is presented

in three stages; that is Training Center for only brief vocational courses, secondary level (for three and four years), and tertiary education (above three years). The earlier scheme or stage is described as the Job Training Center (BLK) for the Vocational Training Center in Indonesia. At the same time, the latest is mentioned as the center of vocational education for Vocational High School (VHS) in secondary, Polytechnics, and Vocational education at Higher Education Institutions/University. VHS is regulated by the Ministry of Education and Culture, notably DITVE stands for the Directorate of Technical and Vocational Education.

The purpose of the research is to analyze the best method and strategy of the Dual VET system in application to Indonesia's Dual VET System by comparing the countries that consider having good practices of the VET System. This research will investigate the differences of responsibilities among the Dual VET actors in Indonesian education systems. This project aims to define the best method for Indonesia in applying the VET System. A lot of institutions will work together, the education institution, government institution, and private sectors. To make this connection explicit, the function of each institution should be made clear. The following are the questions to be asked:

1. What are the most prominent features of the dual VET system in Germany?
2. What are the best practices of the Dual VET system that can adapt in Indonesia?

### **Essential Factors in building the System**

The main challenge for Dual VET systems to develop in many countries is that companies are not used to hire and educate apprentices. Companies hesitate to invest in the education of young people. As skilled professionals are in high demand in the labor market, most skilled graduates leave the company after their graduation. Other scholars also mentioned the challenges of applying the VET system. Kadir and Bachrul, (2016), listed the challenges of VET in Indonesia. Most people in Indonesia still have negative stigmatization about vocational schools. Other challenges vary from the funding, the quality of vocational teachers and lectures, the industry involvement for vocational education, and the inter-agency coordination. The Indonesia geographical features also become a challenge for Indonesia to provide the same educational facilities between the cities and remote areas.

Winslow *et al.*, (2013) found that the arrangement varies within each country. This arrangement consists of several aspects such as the system of certification, the competencies focus, apprenticeships, and the ratio of time-consuming between the workplace and school. Hoffman, (2011) emphasizes that all stakeholders, such as the employers, unions, government, professional organizations, licensing programs, educational boards, and individual schools, need to join in creating the policy and

building a legal framework to actualize the vocational system. On the other hand, Eichhorst *et al.*, (2012) mentioned that based on international experiences, it is not easy to implement the dual VET system even though this system may seem the best system to implement to link education and the industry. Dual VET and VET usually only effective if major actors significantly support them. For example, this system will work effectively if the employer engages in structured and systematic training and an up-to-date training curriculum. It is essential to include the employers in designing the training schemes since they understand better what they need in the workplace. Moreover, vocational school could only be successful if they have accepted as a promising option to start a career.

### **Integrating/Adopting the Dual System of VET**

In the VET, define of the dual system are combine school and work-based learning. Scholars on this topic agree that the dual system better integrates apprentices into the actual work, high skills, and low unemployment (Busemeyer & Trampusch, 2012). Dual System means the presence of different locations to learning, In schools and companies/industries with each rule and rationalities (Nieuwenhuis & Van Woerkom, 2007). An apprentice regularly gets through the boundaries between workplace and school; thus, they must connected knowledge from two different place (Guile *et al.*, 2003).

The dual system main purpose of Vocational Education and Training is to assist each student in developing competence so students can meet up-to-date and future world work and take part in determining vocational lives. Due to ongoing transformations in the community, economy, and workplaces; Adaptation to maintaining effectiveness and efficacy contributed to pressure the dual system in VET. Consequently, especially since the 1980s, many adjustment processes have taken place on different system levels, namely the institutions involved, the syllabi for the different venues, and the teaching-learning processes (Fürstenau *et al.*, 2014).

### **METHODOLOGY**

The comparative analytical studies in this study collected primary documents from government institutions, including the Ministry of Industry. Secondary documents from analysis report from OECD (Organization for Economic Co-operation and Development), and scholars to meet the feature selection by both countries. Bukhari, (2011) stated that Comparative studies are the studies to demonstrate the ability to

examine, compare subjects or ideas. Comparative study shows how two issues are similar or show how two problems are different. When the practice of comparative study began is a matter of debate. Similarity, Coccia and Benati, (2018) mentioned that the comparative study is established on strategies and research techniques for present conclusions about cause and effect or association of identical or dissimilar factors among more subjects/objects. Moreover, to analyze the synthesis of variability and constants that describes structures, processes, policies, and elements, taking into consideration the local, regional, national even more global contexts.

The selection of Germany as the primary model is because two dual models in Europe with a long tradition have been analyzed. The current debate has caused an increasing international interest in the dual system in Europe and triggered a trend to transfer such VET systems, or parts of it, to foreign countries (Bauer & Gessler, 2016).

## **RESULTS AND DISCUSSIONS**

### **Vocational Education in Indonesia**

Indonesia adheres to the unified system or integrated system. The achievement of learning for academic education, vocational or profession for the same or equivalent qualification level, even equal with the result of in formal or informal education, get attention in the Indonesian Qualification Framework (IQF) or “Kerangka Kualifikasi Nasional Indonesia (KKNI).” IQF in Indonesia is structured as a unified framework of qualifications for all education sectors, training, and employment.

Indonesia National Quality Framework, known as Kerangka Kualifikasi Nasional Indonesia (KKNI) is the national framework used to assess an individual or a graduate in knowledge, competencies, and skills following the learning outcomes and achievements. This framework can also be used to describe job qualification that matches, equates, integrates, the education and training sectors and work experience as part of job competence recognition. KKNI qualification level is based on a nationally agreed level of learning outcomes or training gained through formal, non-formal, informal, or work experience. Figure 1 shows KKNI consists of 9 levels, starting from qualification 1 as the lowest qualification to 9 as the highest qualification (The Australia-Indonesia Centre, 2019).

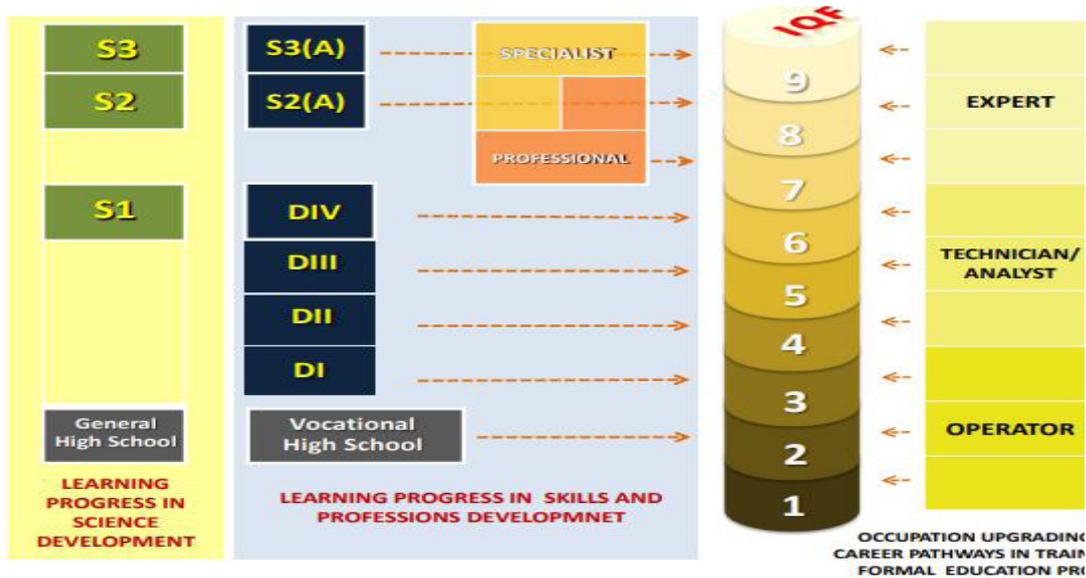


Figure 1. Indonesia National Quality Framework: Megawati Santoso, (2013)

## Preferences

There are several kinds of vocational skills institutions available within the country. They offer informal and non-formal education and issue certificates, diplomas, or degrees. The institutions mentioned as follow: 1) the vocational senior secondary schools and the Islamic vocational senior secondary schools; 2) community colleges; 3) polytechnics; 4) universities; and 5) vocational centers (Triyono & Moses, 2019). This research will focus more on the institution with the most enrolled students for vocational education.

The number of Academic High School and Vocational High School students for the 2017/2018-2019/2020 school year has increased, as seen in figure 2 below:

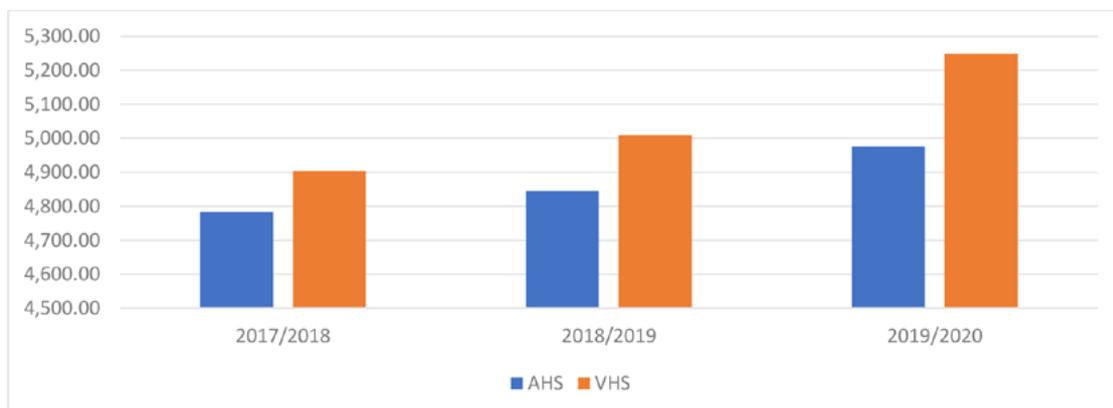
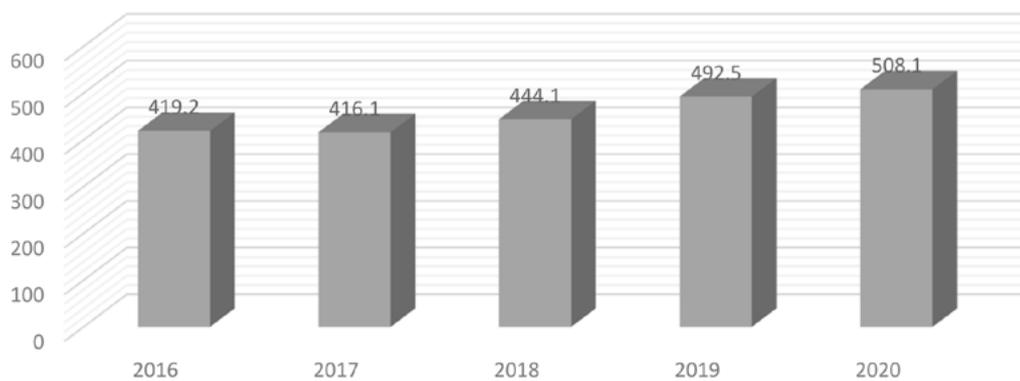


Figure 2. The number of Academic High School (AHS) and Vocational High School (VHS) students for the 2017/2018-2019/2020 (in million): (Central Bureau of Statistics, 2020)

From the table above, the number of the student is increasing every year. It is reflecting that the growing demand of people who want to learn technical skills. This becomes the new basis of the Indonesian government to develop the new goal to build on that demand. This goal could be pursued by increasing the investment and expanding the vocational schools widely across the nation.

**Financing**

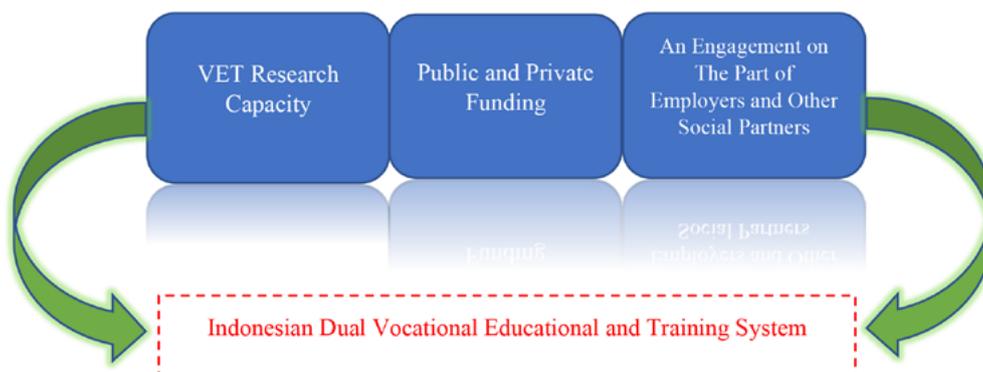
The development of Indonesia’s VET system lies in many different stakeholders, which have different levels of responsibilities. Therefore, it is hard to measure the exact amount of funding from each stakeholder. This funding generally provides financial support for VET’s operational cost, infrastructure, and salaries for the lecturers. The following is the Indonesian government budget for education (Figure 3):



*Figure 3. Government budget for education in Indonesia from 2016 to 2020: (Statista Research Department, 2021)*

**Dual VET System in Germany that can Adopt in Indonesia**

From the analysis report issued by the OECD, three main features can be adopted in Indonesia, including those mentioned in Figure 4 below.



*Figure 4. Strengths Vocational Education and Training in Germany*

Increases in the digital era are transforming how humans live, work, and begin a new magnitude to learning. Precisely, the industrial revolution 4.0 period transforming the role of workers and production conditions brought about by digital alteration in entire financial zones. The industrial revolution 4.0 builds the technological preconditions for self-structure, self-direction, and self-maximization of value-added chains and production (Hirsch-Kreinsen & Weyer, 2014). The German system has institutionalized VET research capacity, so their human resources are ready for it (Anderson et al., 2003; Boak et al., 2008; Curtain, 2004).

Applied research no longer must be considered; it has become an essential requirement for Vocational Schools in Indonesia to unravel current problems and predict industrial needs in the future. The Directorate General of Vocational Education, Ministry of Education, Culture, Research, and Technology has just launched the Domestic Applied Scientific Research Program-Vocational College Lecturers for all vocational people in the country. This program is demand-driven; in other words, research-driven based on demand and needs to solve real problems in the business and industrial world (DUDI), markets, and society. This program is funded by the Education Fund Management Institute (LPDP) with an allocation of IDR 25.5 billion (Kemendikbudristek, 2021). The Director General of Vocational Education at the Ministry of Education and Culture (Kemendikbud) Wikan Sakarinto said that “*research development is an important capital in developing the world of vocational education*”. However, he underlined that the research made could be used and not just a formality.

## Public and Private Funding

Non-existence of direct monetary persuasions from the government for owners who cooperate in dual study programs. However, conditionally, higher education institutions accept any state funds for promoting these programs. In particular, the Bavarian Ministry of Education and Research has monetarily assisted 17 Bavarian Fachhochschulen (Bavarian technical colleges) for developing dual study programs in cooperation with regional owners and extensive businesses, therefore linking central financing with decentralized establishment work (Weich & Kramer, 2016).

The strategic plan of the Directorate General of Vocational Education for 2020-2024 states that funding in general for work units uses funds from the State Budget (APBN), Regional Revenue and Expenditure Budget (APBD), and Corporate social responsibility from companies/partners World Business Industry or DUDI (Directorate General of Vocational Education, 2020). The role of the private sector should be maximized to reduce the burden on the government in terms of funding, where the government can provide reciprocity in the form of tax reductions, soft loans and other benefits.

## **An Engagement on The Part of Employers and Other Social Partners**

Numerous international vocational education and training experts admire the German program to VET. Nevertheless, VET does not possess such an honored standing in all levels of the community elsewhere. Mainly in society, academic education is preferred above applying for vocational education and “is seen as a second-best option, an option for lower achievers” (Ruth & Grollmann, 2009). Among the factors is being that multiple VET grads are not qualified to perform the tasks of the profession within the actuality of work (Ratnata, 2013).

Fortunately, vocational schools are the favorite (can be seen in figure 2) compared to academic schools in Indonesia. However, the bad news is that the ability of vocational school graduates in Indonesia is deficient and accounts for the largest unemployment compared to other school levels. Need extreme improvement and coordination between employers in the industrial world, schools, government, and other related parties. This means Indonesia must Revitalizing cooperative relations between the government and the private sector/business and industry (DUDI) provides resources, both in the learning process, practice, and apprenticeship.

## **CONCLUSION**

Many studies have discussed the success of the dual vocational training system from Germany. That success has been adopted by several other European countries and developing countries in Asia. However, not all features can be adopted because each country has different characteristics in their education system.

Several features that can be adopted by the government related to the dual vocational education and training system have been mentioned in the discussion chapter. The government does not need to make radical changes because several features have been adopted; it is enough to take a different approach to achieve the stated target. In addition, the government needs to change the priority scale for policies issued, for example, for the new school construction budget, to be stopped for several periods and transferred to another.

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# **Unemployment Status of Vocational School Graduates and Its Implications**

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## **Abstract**

In data from the Central Bureau Statistics (CBS) in May 2020, vocational high school graduates (VHS) are the largest unemployed in Indonesia. Whereas VHS graduates are expected to contribute to quality labour due to quality labour, it is crucial to achieving a win in the global labour market competition. This study aims to identify the factors that cause high unemployment from VHS Graduated in Indonesia. This study used secondary data from a database published by the CBS, the condition of Indonesian Manpower February 2020, the Ministry of Education and Culture of the Republic of Indonesia, and from Government Regulations and the Ministry of Manpower. This study also uses secondary data to identify the causes that affect the open unemployment rate, especially for VHS graduates.

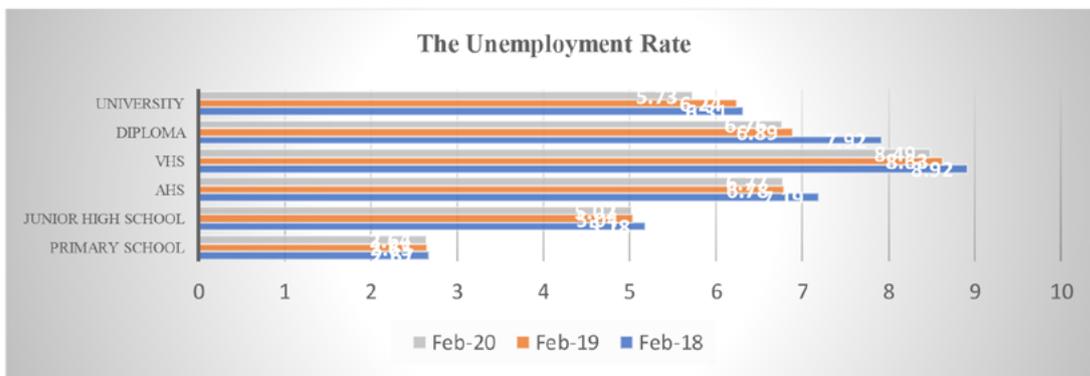
The main cause of unemployment rate dominated by VHS graduates in Indonesia are: (1) the Quality of VHS Graduates; (2) the curriculum is not relevant to the times; (3) many vocational programs are not according to the surrounding industrial world's needs; (4) The presence of productive teachers in VHS is still less than sufficient. The implication of Solving Problem is: (1) Strengthen link and match between vocational education and the work of world; (2) Revitalization of VHS and Teacher; (3) Improve the Quality of Graduate; and (4) Strengthen relationship with Industry.

## **Introduction**

United Nations in 2015 in The 2015 Revision of World Population Prospects reporting a population of the world is expected to reach 8.5 billion in 2030, later will increase to 9.7 billion in the year 2050, and surpassed 11 billion in the year 2100 Moreover, Indonesia's entry into the category of countries with an enormous population growth rate in the world is significantly related to the term "Bonus Demographic," whose peak is expected to occur in 2020 until 2030 (Umar, 2018).

According to (Raharjo Jati, 2015), this is undoubtedly a challenge and a threat for the Indonesian population. There will be an explosion of unemployment and the occasion for economic growth and community welfare. VHS graduates are the most significant contributor to Indonesia's unemployment, according to the data from the CBS in May 2020. The government realizes there are crucial issues in vocational education that need to be fixed rapidly.

Figure 1. Unemployment Rate (UR) According to the Highest Education Completed (percent), February 2018-February 2020.



Source: Central Bureau Statistic, Indonesia, 2020

The data show that In February 2020, UR VHS was still the highest among other education levels (8.49 percent), while the lowest UR was at the elementary school level and below (2.64 percent). According to (CBS Indonesia, 2020), VHS graduates' open unemployment level is still the highest. The UR was recorded at 8.49%. From this data, it was found that the most significant number of unemployed in Indonesia is graduated from vocational high school from year to year. This means that VHS graduates cannot readily be accepted to work even VHS graduates as contributors to unemployment in Indonesia. In other words, there is an unabsorbed labour supply, especially at the level of vocational and academic high school education. Whereas VHS graduates are expected to contribute to quality labour due to quality labour, it is crucial to achieving a win in the global labour market competition.

Based on data from the Directorate General of Primary and Secondary Education Ministry of Education and Culture (Ministry of Education and Culture) of the Republic of Indonesia, several aspects cause the high unemployment rate of VHS graduates, including the issues of graduate quality that does not equal with industry standards, and also the inordinate supply of graduates (Yunikawati et al., 2018). This situation requires a particular strategy so that VHS graduates can immediately enter the world of work while still paying attention to the needs of Industry. In accordance with the data

descriptions, this research aims to identify the factors that cause high unemployment from VHS Graduated in Indonesia. Moreover, the research questions are outlined as follows: (1) What factors driving VHS graduates to be the highest unemployment? (2) What is the effort to minimize unemployment from VHS Graduates?

## Vocational Education

Vocational Education is education with a curriculum in it that is tailored to the fields and expertise of students (Suryani & Hamdu, 2021). VHS is one of the vocational schools in Indonesia which plays an important role in producing qualified graduate candidates who are ready to work, equipped with knowledge, skills and work attitudes in accordance with their fields and in accordance with the needs of the Business World and the Industrial World (Patmanthara & Hidayat, 2018; Suharno et al., 2020; Yahya et al., 2017).

Along with the development of Information Technology and the industrial world, the curriculum must also be adjusted to the times (Billett, 2003; Hodge, 2016; Retnawati et al., 2016; Vähäsantanen & Eteläpelto, 2011; Wheelahan, 2015). VHS is required to prepare graduates according to industry needs so that they can keep up with market demands that continue to grow and change. Thus, vocational schools must adhere to the 'Link and Match' policy which produces insights into the future with quality, excellence, professionalism, added value, and economy in providing vocational education (Morris, 2013; Tran & Nyland, 2013; Yanming et al., 2017).

Goyena & Fallis (2019) describes that the quality of good vocational education is when students who have undergone education can be accepted into the world of work according to their field of expertise. Based on the above statement, it can be argued that VHS as a graduate producer, must be able to make each student have the capability, skills, competency, and expertise that are following the requirements and demands of the world of work.

Table 1. A total amount of VHS and AHS in Indonesia

Year	Total Number VHS		Total Number AHS	
	Public	Private	Public	Private
2017/2018	7.111	21.023	13.569	13.850
2018/2019	7.191	21.222	13.693	13.995
2019/2020	7.245	21.279	13.774	14.076

Source: (<https://dapo.kemdikbud.go.id/>) (Kementerian Pendidikan dan Kebudayaan, 2020)

According to Table 1, VHS' existence has sufficiently supported industrial development in terms of quantity. There are currently around 7,245 for public vocational schools and 21,279 for private vocational schools throughout Indonesia, whose numbers are greater than those of Academic High Schools.

## **Methodology**

The study is a documentary study or research by using secondary data. Documentary Research uses personal documents and formal documents as material references. Documents can comprise journal articles, webpages, and government statistics. Secondary data were acquired from a database published by the CBS, the condition of Indonesian Manpower February 2020, the Ministry of Education and Culture of the Republic of Indonesia (for education database), and from Government Regulations and the Ministry of Manpower (for workforce educational background data). This study also uses secondary data to identify the causes that affect the open unemployment rate, especially for VHS graduates.

## **Results and Discussion**

### **Causal Factors of Unemployment**

#### **Quality of Vocational High School Graduates**

VHS graduates' contribution to the number of unemployed in Indonesia is partly due to VHS graduates' lower special skills or soft skills compared to high school graduates. However, this case was not found in VHSs, whose educational quality had been tested (Chandra, 2017). Soft skills can be seen in the way individuals understand their psychological condition, organize speech, thoughts, and attitudes following the surrounding environment.

Vocational education in Indonesia has suffered a tremendous setback. The lack of facilities, teacher competence, and the industry's role is a trigger (Suharno et al., 2020). The reason of VHS graduates is hard to obtain a job is a competence that is not following the demands of the job seekers, VHS graduates only proficient in one area, the program of study used in vocational only as a print worker, not become print entrepreneur, and the mushrooming VHS with homogeneous major (Yunikawati et al., 2018). There were three micro problems which became a problem of the inadequate quality of vocational graduates with the needs of the industry:

## **1. VHS Curriculum**

In Indonesia, the curriculum has been improved several times. First, it was the 1994 curriculum which was later replaced with a competency-based curriculum in 2004. The application of the competency-based curriculum in schools did not last long because two years later, in 2006, the Indonesian government launched a new curriculum namely the 2013 Curriculum. However, the curriculum is not yet relevant to the times because, in reality, the level of education in Indonesia is still below the standards proven by the Central Bureau Statistic of Indonesia data which states the number of unemployed based on education levels.

In its development, the 2013 Curriculum faces several challenges, particularly on the teachers' perspectives. Ruja (2017) noted that teachers are still having difficulty in developing the lesson plan and facing difficulty on evaluation (Nasution, 2017).

The curriculum must be relevant to the times. This needs to be linked to create graduates who have a profile according to industry needs. On the other hand, the curriculum must also adjust to the existing generation. Indonesia is currently also in the millennial generation, a generation with the correct information technology capabilities. Indonesia has paid attention to this with Presidential Instruction No. 9 of 2016 regarding VHS's revitalization. This has become important to overcome the rapid development of the times. However, curriculum development is not well understood by all teachers.

## **2. Industrial Relationship**

Indonesian workforce's main challenge is the incompatibility of the education system with industry needs. For that link and match program is very helpful. VHS graduates can work following what the industry needs. The vocational level's high unemployment rates are because many vocational programs are not according to the industry's surrounding world's needs. Besides, because many VHS programs do not have equipment that is no longer used by the industrial world, they are skilled but not mastering the industrial world's skills. This condition also occurs because VHSs are no longer in cooperation programs with the industrial world, so graduates do not follow industry needs. Progress is expected from vocational education goals. There must be a Link and Match with the industry's demands that still require a lot of middle-level skilled workers to fill the work of implementing staff in their respective fields of expertise. In reality, many VHS graduates have not adjusted to their assigned tasks' needs and demands. VHS must be able to adapt to the development of industrial markets. Thus, the graduates can be absorbed by the industry.

### 3. Teacher of VHS

Teacher plays a crucial role in character building as an attempt at a moral revolution. For this reason, teachers are required to be creative and innovate in the learning process (Sugiyo & Purwastuti, 2017). Meanwhile, Susanto (2015) mentioned that effective learning measures of the success of teachers in managing classes. In addition, the community has high expectations for the teacher to become skilled in implementing curriculum and learning instruction in helping students learn and succeed. (Wulandari et al., 2020).

However, the existing condition indicates that there are still many teachers who have not fully understand the 2013 Curriculum. Teachers as the spearheads of educational activities need to understand in depth about the basic concepts of Curriculum 2013. Besides that, other factors influence the shortage of qualified VHS teachers and teachers in vocational high schools do not have direct background or experience in the industrial world. At present, VHS still lacks productive teachers who can teach two skills (Sandy, 2019).

#### **The implication of Solving the Problem**

##### **Strengthen link and match between vocational education and the work of world**

The labour market information system should be created and used to minimize the gap between supply and demand for labour. Graduates from vocational secondary schools must be skilled, flexible and technology-literate to meet the human resource demands of Indonesian economic development. Enterprise-based training, small and medium-sized enterprises should be taught extensively and intensively in vocational secondary schools ((ADB), 2009). At the school and local district levels, career centres must be established to function in sharing labour market information, particularly job vacancy information to graduates (Indana & Soenarto, 2019).

Policy analysis is needed to provide accurate information to policymakers and practitioners to make accurate decisions about Indonesian vocational education development. Learning excellent practices from other countries is also needed. Therefore, cooperation with other countries having excellent vocational institutions such as Germany and Switzerland are urgently needed in terms of consultation in formulating a vision, mission, objectives, policy direction and policy dimensions. And policy implementation, such as dual system design and implementation.

### **Revitalization of Vocational High School and Teacher**

Four points focus on school revitalization VHS instructed in (Instruction of Presidential Number 9, 2016). These points cover revitalization of the program of study, education personnel, educator availability, collaboration, and graduates. Revitalization in terms of educators and education staff, mainly aimed at teachers (educators). The revitalization also aims at enhancing teacher competency.

Besides the curriculum, revitalization is also done in educators and education staff, especially teachers. Besides the aspect of availability, revitalization also aims at improving teacher competency. The government has made various efforts to improve teacher competency, including involvement in education and training activities, workshops, seminars, and model selection of teachers to provide professional allowances as a means for teacher self-development. As a short-term solution, meeting the needs of productive teachers is done through multiple expertise programs. Two things need to be done to support so that the model of fulfilling the quantity of productive VHS teachers in each province can run well. The first is determining the Roadmap for Productive Teachers' needs in the region, which will relate to the second, namely obtaining data on VHS Productive Teachers' needs in each province.

Wulandari et al., (2020) stated that improving teacher quality can be done with a teacher certification system (Susanto, 2015). The implementation of teacher certification becomes an important aspect in supporting improvement of the quality of learning and education (Suratman et al., 2020). It is necessary to highly motivate teachers and be able to assist teachers in the fulfilment of qualification and competence standards that have been determined. The implementation of the certification will improve teacher performance through increasing pedagogical competence, personal competence, social competence and professional competence

### **Improve the Quality of Graduate**

The supply of labor from education and training institutions must link and match the needs of the industry quantitatively and qualitatively. Education planning must consider the supply demand of the workforce. Supply must link and match with demands required by the world of work. the leading concept of collaboration between vocational education and the world of work is from Germany, known as “Vocational Training in the Dual System” or “dual system” for short.

Simply summarized, in the dual system, the number of students going to be trained in the company is based on the capacity of the company to accommodate students. In the dual system, students spend roughly one third time in vocational school and two-third time in the company. Thus, in the dual system, company experiential-based training is complementary with school-based related theory learning. In vocational school,

students learn general education and the related theory of work, while in the company, students learn real jobs. The term dual system is sometimes used synonymously with the term experiential education. Experiential education refers to planned education experiences designed to enable learners to acquire attitudes, skills, and knowledge for work and other life roles by participating in work settings. Experiential education may include experience-based career education, cooperative education, action learning, apprenticeship, dual system, clinical experiences, supervised external study, field experience, educational practices, work experience education, work-study, external degree programs, internship, and others (Ohara et al., 2020).

### **Strengthen relationship with Industry**

The government needs to rigorously control the industry's role, like other developed countries, by building a vocational education revitalization team supported at a reasonable cost. For this reason, it is also necessary to improve cooperation with universities and between ministries.

The solution to overcome unemployment for VHS alumni is not only from one side, but all parties involved must work together to reduce the space between VHS alumni and the world of work. VHS is required to create Human Resources (HR) who can adapt to science and technology development, which tends to be advanced. Consequently, that a contextual-based curriculum must be implemented in learning at VHS currently. A contextual-based curriculum will make it easier for VHSs to equip students with skills and knowledge according to their skill programs.

Schools need to collaborate (link and match between schools and business/industry world, government agencies and company associations such as Indonesian Young Entrepreneurs Association, Indonesian Entrepreneurs Association, Indonesian Chamber of Commerce, Indonesian Muslim Entrepreneurs Association, and universities. Collaboration between schools and industry needs to be applied because some school activities always involve the industrial world, such as job training, industrial practice (internships), and industrial visits. The industrial world is expected to be more involved in the formation of student skills through collaboration. For instance, the industry provides equal opportunities for VHS alumni to compete globally with other similar rank alumni. Additionally, through apprenticeship, the sector must provide appreciation and feedback to students recruited as workers in companies. This must be accompanied by reflection through practice while in the company. Apart from an apprenticeship, schools must further implement the teaching factory to strengthen VHS and industry cooperation or synergy.

Every VHS graduate must pass a competency test and certification recognized by the business world to find out whether the quality of VHS graduates can answer the needs of the industrial business world or not. One of the benchmarks that can be

used to return to VHS graduates' quality issues is building and developing Human Resources to support the economy's growth as measured through the Human Development Index.

### **Conclusion**

The leading cause of the unemployment rate dominated by VHS graduates in Indonesia is the shortage of teacher competence and industry role becomes the triggers. Through Presidential Instruction No. 9 of 2016 concerning Revitalization of VHS, the world of education, especially VHS, is greatly helped because there will be a synergy between related agencies and institutions in agreement with their respective responsibility and functions in a struggle to enhance the quality of VHS. Therefore, the government focuses not only on the number of teachers but also on the quality of teachers in teaching, curricula adapted to current working conditions, and can bring the industry closer to students as early as possible. Suppose the school curriculum could be harmonized with developments in information technology and the industrial world. In that case, unemployment at the VHS level will decrease. The resulting graduates will have a work-ready attitude according to their field of expertise. Thus, it can be ascertained that a curriculum aligned with the development of Information Technology and the industry world will succeed in producing graduates who are ready to work.

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# **The Primary study of the Impact of COVID-19 Epidemic to Ocean Cultural Production Industry in Lanyu**

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## **Abstract**

After the global pandemic of the new crown pneumonia (COVID-19) in 2020, Taiwanese are unable to travel abroad, and they have flocked to outlying islands, Hualien and Taitung to travel. The number of tourists has increased sharply during the last summer vacation. For Taiwanese, Lanyu has become the first choice for traveling becomes their unique ethnic culture even though transportation is the most inconvenient compared to other outlying domestic islands. Lanyu is an island inhabited by the Tao/Yami people and has special marine cultural assets. Will this year's retaliatory tourism wave bring a negative impact to the local natural ecology of Lanyu? Especially in the summer peak season, more than 30,000 visitors per month were traveling in Lanyu. This is like the historical abnormal climate condition of more than 200 mm in three hours. If too many tourists are concerned with the fragile island ecosystem as excessive heavy rainfall, torrential rain can cause disasters, then excessive tourists are also reasonable to assume such as disasters to ecosystem? Although the crowd is the money, the tourism assets of the island marine culture need to be sustainable. Otherwise, 20 years may not be enough to recover the ecosystem of the one year destroy. This study aims to understand the impact of the epidemic on retaliatory tourism and its impact on regional revitalization. What is the real situation of Tao/Yami youth returning to their hometowns to start a business? What are the ideas of the residents living on Lanyu Island from different generations? Understand the main force that sustains the rebirth of ocean culture? Only a vibrant marine nation can continue to create a steady stream of regional revitalization. The relationship between the cultural production industry and Teaching and Vocational Education and Training

in Lanyu can be founded. Before the exploration of the COVID-19 epidemic, there were already many tourists visiting Lanyu, but retaliatory tourism had negative impact to the environment for the little island, Lanyu. The cultural and art creators have less influence for the impact of retaliatory tourism because tour group do not have high proportion in purchasing air pieces or cultural products. These art creators are still proceeding with his original life and creative pace. The bigger impact is the large increase in the number of tourists, the increase in living consumption, and the supply of homestays in short supply, resulting in a surge in garbage and insufficient water, and water pollution increases, which in turn damages the island's ecology and degrades the quality of housing and tourism. Our study will contribute to the government for better policy recommendations and implement far-sighted policies to reduce the environmental impact of excessive tourists exceeding the ecological load. Tao/Yami can continue to move towards sustainability and maintain their unique marine culture.

**Key words:** cultural production, Tao/Yami, post covid-19 era, Lanyu (Orchid Island), Regional Revitalization

## Introduction

The origin of the research: After the global pandemic of COVID-19 in 2020, Taiwanese are unable to travel abroad, and they have flocked to outlying islands and Huadong to travel. The number of people has increased sharply during the summer vacation. For Taiwanese, the most inconvenient but also full of ethnic style, the outlying island, Lanyu, has become the first choice for traveling. Lanyu is an island inhabited by the Yami/Tao people and has special ocean cultural assets. Will this year's retaliatory tourism wave bring a negative impact on the local natural ecology of Lanyu? Especially in the summer peak season, there are more than 30,000 visitors per month. This is like the historical abnormal climate condition of more than 200 mm in three hours. If too many tourists are concerned with the fragile island ecosystem as excessive heavy rainfall. Although tourists bring the income for the local, the tourism assets of the island marine culture need to be sustainable. This study aims to understand the impact of the epidemic on retaliatory tourism and its impact on local creation? What is the real situation of tribal youth returning to their hometowns to start a business? What are the ideas of the residents living on Lanyu Island from different generations? What is the main force for cultural production? Only a vibrant marine nation can continue to create a steady stream of local creation. I hope that the government will be given correct policy recommendations and implement far-sighted policies to reduce the environmental impact of excessive tourists exceeding the ecological load. Yu can continue to move towards sustainability and maintain its

unique ocean culture and make a better situation for cultural industry.

**Research purpose:** This study focused on the ocean culture industry, tourists, regional Revitalization, retaliatory tourism, sustainable development, tribal cultural revival, environmental education and other conditions in Lanyu Island, and interviewed the island of people, in the six major tribes of Lanyu Island. Through understanding their experience and opinions, combined with the results of scientific experiments, analyze the impact of seasonal sightseeing activities on local water resources management. The overall research method is modified based on Given, M. (2008). The research results will be used as a policy reference to provide suggestions on local creation, marine culture, tourist population, behavior and influence, promote sustainable tourism in Lanyu, and reduce the impact on the local impact of residents' daily life and environment.

**Research focus:** Lanyu, the Orchid Island, has always maintained a unique ocean culture. The 21st century encountered a global pandemic of the virus for the first time in the 21st century. How can the island of humans continue to survive this adversity? The new crown pneumonia epidemic that began in 2020 has experienced the retaliatory tourism wave in the peak tourist season of 2020, the three-level alert soft island closure from May 2021, and the impact on the local ocean culture, cultural creation and nature of Lanyu since the closure of the island. Environmental impact.

**Expected goals:** We hope that through this research, we can learn about those impacts, like the different age groups in Lanyu Island, the island of people, regarding ocean culture, tourists, regional Revitalization, retaliatory tourism, sustainable development, tribal cultural revival, ecosystem and associations. Because the limited research time, it is impossible to study the current situation of the COVID-19 pandemic period from 2021 to the end of the year. Therefore, this research is expected to be a preliminary research. We hope to summarize the ideas and problems of the residents on Lanyu Island. The study will contribute Taiwan government for their future policy making to help Orchid Island and local residents maintain their unique ocean culture and ecology.

## Methods

Researchers conducted surveys in 6 tribes in 4 administrative villages in Lanyu. According to age classification, the interviews were conducted from residents of 20 to 29 years old, 30 to 39 years old, 40 to 49 years old, 50 to 59 years old, and 60 to 69 years old. Each interview took about 1-2 hours. According to research needs, the number of interviews of the respondent may be more than 2 times. The purpose of classification by age is to understand the similarities and differences in the views and experiences of generations on the island's changes. Conducting interviews with village classification will help to understand the understanding and experience of the situation of the research problem in the different spatially distributed communities on the island.

The sampling method will be convenience sampling, snowball sampling and intentional sampling. Through the personal network established by the researchers in the villages, schools and administrative units of Lanyu, the snowball sampling is carried out, and the interviewee introduces relatives, friends, and so on. as the next interviewee. Because the researchers are expected to go to Lanyu every month, they will also conduct convenience sampling in the local area to interview residents who meet on the island. In order to balance the number of interviewees of all ages, genders, political and economic status, and other backgrounds, the researchers will use intentional sampling to ask individual people's willingness to be interviewed.

This research conducted a semi-structured interview method. The researcher used the interview outline as the basis. During the interview, other questions were extended along with the respondent's response and experience. When designing the question, the researcher used the principle of not guiding the interviewee, trying to obtain local opinions and experience, so as to enrich the first-hand data of this research and conduct analysis. The research locations were various, such as the interviewee's home living place, school, public place, and daily work place, so that the interviewee can conduct the interview in a more relaxed and comfortable environment. During the interview, the researchers also asked questions about associated issues of water resource and water pollutions on marine culture and sustainability for the purpose of analyzing the aboriginal ecological wisdom. During the interview process, the researcher also adjusted the wording of the interview questions according to the interviewee's situation in order to effectively complete the interview.

Semi-structured interviews have the following advantages: 1. It is often possible to adopt a more open attitude towards specific topics to collect data. When researchers use semi-structured interviews to collect data, they often get unexpected

gains. 2. When interviewees are less restricted in the interview process, they tend to adopt a more open attitude to reflect on their own experiences. 3. When the researcher's motivation is to understand personal life experience or compare interview data, semi-structured interviews can be said to be a very suitable way to use. However, the information obtained after semi-structured interviews often tends to be numerous and lengthy. In order to prevent the omission of the interview content, it is necessary to use audio recording, video recording or photographing to help record the information in order to achieve the completeness and accuracy of the data.

The outline of the one-to-one interview is as follows. The actual terms and questions were adjusted according to the current situation, instead of the interview in the following order:

1. What do you think is the connection between the ocean culture of Lanyu and regional Revitalization?
2. What do you think is the connection between the ocean culture industry of Lanyu and regional Revitalization?
3. Do you think more tourists can promote regional revitalization? Why?
4. Do you think more tourists can promote cultural production? Why?
5. Please give me an example of the combination of Lanyu ocean culture and regional revitalization that you know?
6. Please give me an example of the combination of Lanyu ocean culture and cultural production that you know?
7. What are the reasons why tribal youths return to their hometown?
8. What is the impact of retaliatory tourism derived from the COVID-19 epidemic on Lanyu?
9. The Lanyu traditional woody ship (Yami/Tao language: Tatala) experience is an example of a typical ocean culture combined with regional revitalization. How do you think it can be improved in the future?
10. Do you have experience in assisting with the handling of items or water used by tourists? How is it done? Why?
11. How do you use various water resources in your daily life?
12. How do you deal with the items used in your home life? Why?
13. How do you dispose of the water used in your home life? Why?
14. What do you think are the similarities and differences between residents and

tourists in the use of water resources? Why?

15. Should tourists who come to Lanyu be given environmental education before entering the island? What are the specific measures?

16. If due to the implementation of environmental education and actual sanctions, the number of tourists decreases, but the quality can be improved, how will it affect everyone in Lanyu?

17. How do you think the water resources on the island should be improved? Who is already doing this? How effective is it?

18. Are there similarities and differences in the use and protection of various water resources by residents in the past and present? What's it like?

19. Are there similarities and differences in the use and protection of various water resources by tourists in the past and present? What's it like?

20. What do you think are the sources of sewage in your daily life?

21. Do you think there will be seasonal differences in the source of wastewater from Lanyu? What is the relationship with tourists?

22. How do you dispose of the garbage used in household life? Why?

23. What do you think of the relationship between tourists and water pollution? Why?

24. What do you think are the similarities and differences between residents and tourists in using the concept of sustainability? Why?

25. How do you think the water pollution on the island should be improved? Who is already doing this? How effective is it?

26. What do you think of the residents and tourists' awareness of environmental education? Why?

27. What do you think about the ecological perception of residents and tourists? Why?

28. How do you think residents and tourists perceive biodiversity? Why?

29. What do you think are the possible sources of water pollution in Orchid Island? Why?

30. How do you think Lanyu can achieve sustainable water resources management?

31. What do you think is the sustainability of Lanyu's water resources and marine culture?

32. How well do you understand Lanyu?

33. Your understanding of the marine culture of Lanyu?

34. Your understanding of the cultural creation of Lanyu (for example: the more developed the urban civilization, the more colorful the town culture is needed; tribes and society participate in the cultural creation)?
35. Do you usually pay attention to marine culture and information?
36. Do you think that Lanyu has increased the number of tourists due to the impact of the COVID-19 epidemic?
37. How do you (you) think the impact of the COVID-19 epidemic on Lanyu?
38. How do you think the impact of the COVID-19 epidemic on the regional revitalization of Lanyu?
39. Do you think that Lanyu's energy to initiate regional revitalization should come from internal or external?
40. How do you think the impact of the COVID-19 epidemic on the ocean culture industry of Lanyu?
41. Do you think that Lanyu's energy to initiate ocean culture industry should come from internal or external?
42. How much do you think of the impact of retaliatory tourism (like last year's peak tourist season) on Lanyu?
43. How do you think retaliatory tourism (such as last year's peak tourist season) has affected the regional revitalization of Lanyu?
44. How do you think retaliatory tourism (such as last year's peak tourist season) has affected the ocean culture industry of Lanyu?
45. Do you think that Lanyu cultural and creative products have increased due to the impact of the epidemic?
46. Has Lanyu's cultural and creative products increased because of the increase in tourists?
47. Your understanding of the concept of sustainability (e.g. sustainable water resources, ocean culture)?
48. Your understanding of ecology (e.g. ecological awareness, biodiversity, etc.)?
49. What do you think is the impact on Lanyu since mid-May of this year due to the severe pandemic?
50. What impact do you think of the impact of the COVID-19 epidemic on Lanyu's ocean culture since last year?
51. What impact do you think of the impact of the COVID-19 epidemic on Lanyu's

ocean culture industry since last year?

52. What do you think best represents the creation of Lanyu ocean culture? (People and things)?

53. What do you think best represents the creation of Lanyu ocean culture industry? (People and things)?

54. What are the Lanyu handicrafts and cultural and creative products you know about?

55. Who do you know about Lanyu artists? Anyone who lives in Taiwan or Lanyu is fine.

56. Do you think Lanyu has a unique ocean culture?

57. What is the reason why Lanyu attracts a large number of tourists?

In addition, we also tried to use questionnaire surveys and dialogues to obtain information. We designed two questionnaires. The questionnaire designed for the second time was changed based on the questionnaire designed for the first time, including the basic information of the interviewee and what we want to know.

This project complies with research ethics regulations. When contacting potential interviewees, the researcher will first indicate the identity of the researcher, explain the purpose of the research, and ask whether the other party is willing to become the interviewee after fully informed of the possible impact of the research. Interviewees will decide whether to accept audio recordings or video recordings during the interview process in writing or verbally. Respondents can opt out at any time during the research process and send a request to the researcher in the form of email or telephone, and the latter will destroy the relevant information. The name of the interviewee will be treated anonymously, but gender, occupation, age, etc. may be presented in different ways in the research report if it is not necessary to hide it. The research report will be based on the basic principle of protecting the privacy and interests of the interviewees. All recordings will be managed by researchers, and related recordings and video data will be properly stored in a password-protected computer hard disk.

## **Results**

Because of the prospects of Lanyu's tourism industry and their sense of identity with their hometown, more and more young people wandering outside have chosen to live in Lanyu in recent years. More and more young people come back hometown to live. These young people are willing to learn the ocean culture of Lanyu, in addition to allowing the culture to be passed on. It can also collide with other cultures to create new sparks.

Some interviewees believed that Lanyu's ocean culture industry is difficult to pass on and the environment has been damaged. Apart from external influences, there are also some reasons why Tao/Yami people need to be aware. Some residents in Lanyu who are engaged in the tourism industry said that they have already I'm very busy, and I don't have time to pay attention to the ecological environment of Lanyu and learn about the ocean culture. But in the final analysis, Lanyu become a tourist attraction because of the unique ocean culture and beautiful natural environments. If the culture cannot be passed on, the environment will be also gradually being polluted, and Lanyu's tourism industry is bound to suffer even more damage after ten or twenty years.

After experiencing retaliatory tourism in 2020 and the soft closure period of the island this May to August, more people in Lanyu understand that the importance of sustainability and the natural environment has the so-called load. The retaliatory tourism before the closure period of the island has prompted more frequent exchanges between Lanyu artists and the outside world artists. Some artists have more free time to create and communicate internally to create more art piece. Some artists become busier to do farming to maintain their family daily life and meals, which result in less time to produce creation. The above will promote the creation of the Tao/Yami ocean culture more diverse.

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# Transformation of Vocationalization of Village Communities Through Small and Medium Industries in Kulon Progo

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## Abstract

Several studies have investigated non-formal TVET vocational studies in the global community. The Kulon Progo government in realizing the sustainable development of the SDGs (Sustainable Development Goals) still experiences a high poverty index but a high level of happiness for rural communities. The purpose of this study is to explore the activities of the community for cultural, socio-cultural, technological, mutual cooperation and politics of Kulon Progo "bela-buying" products with a high "nationalist and idealistic" spirit. This study uses phenomenology with hermeneutic analysis for six months. The contribution of this research provides the practice of community life based on the entrepreneurial spirit of youth, mutual cooperation, high gratitude, the role of OPD from the village to the sub-district to drive the buying and selling of Kulon Progo. The expertise of the vocational community in Kulon Progo Regency is that the labor aspect can work for three months to produce handicrafts, batik, and handicrafts to penetrate the global market. This unique finding is the result of identical crafts to be developed into a tourist village that can be juxtaposed with tourism potential, creative crafts, and local education. The practical contribution of this research shows that praxis is dominated by the community of youth's persistence to continue to be creative, the role of pentha helik, international language communication, mutual cooperation, and the use of technology that accentuates strong village vocations. The implications of this research study are knowledge about the role of technology, creativity, mutual cooperation and commitment to social entrepreneurship to have an impact on people's happiness and welfare.

**Keywords:** village, community, transformation, vocational, craft, tourism

## A. INTRODUCTION

Indonesian people aged 20-27 years have a 69.7% interest in becoming entrepreneurship and 68.3% aged 28-35. However, based on the Global Entrepreneurship Index (GEI) in 2018, Indonesia only had a score of 21% ranked 12th in Asia or ranked 94th out of 137 countries (Slamet et al., 2020). This means that community entrepreneurship in Indonesia is still 3.1% lagging behind developed countries having entrepreneurship above 14%.

As data (Depkop, 2018), in 2018 the number of Large Enterprises in Indonesia  $\pm$  5,550 units (0.01%) and Micro, Small and Medium Enterprises (MSMEs)  $\pm$  64,194,056 units (99.99%) with details: Medium  $\pm$  60,702 units (0.09%), Small Business  $\pm$  783,132 units (1.22%) and Micro Enterprises  $\pm$  63,350,222 units (98.68%). This situation shows that micro-enterprises are the main support for the sustainability of the national economy in Indonesia, so with the COVID-19 pandemic, the MSME sector is the biggest point.

The main role of Human Resources (HR) in improving the quality of work in the field is emphasized through the Ministry of Manpower of the Republic of Indonesia (2019) that the development of human resources is aimed at creating skilled, independent, productive, creative, innovative and disciplined human beings as well as future-oriented to create a better life. So far, the Indonesian Human Resources Index 2020 has been recorded at 0.54, up from 0.53 in 2018 as evidenced by the results of state spending for human capital (World Bank, 2020). Along with the increase in the HR index ratio in Indonesia, the need for certain fields has increased, one of which is the economic sector. Unlike the previous period, in conditions of recovery due to the Covid-19 pandemic, this time there must be sustainable stability in the long term in improving the Indonesian economy. One of the roles that have a strong defense is by empowering the community in mobilizing and encouraging them to explore potential in this case, it is aimed at Micro, Small and Medium Enterprises (MSMEs).

The existence of MSMEs greatly affects the nation's economy. Based on data from the Ministry of Cooperatives and Small and Medium Enterprises of the Republic of Indonesia (2018), it was recorded that in 2018 the number of MSMEs in Indonesia was 64,194,057 MSME units which became the driving force of the Indonesian national economy, because there were more of them than large companies. The spread of MSMEs is very wide and even, especially in all rural areas and has great potential for job growth (Tambunan, 2006). In 2020, it was shown that Indonesia's economic growth experienced a recession at -3.49% and this situation made the conditions that had the greatest impact on micro-enterprises on the sustainability of the national economy in Indonesia with the impact of the COVID-19 pandemic making the MSME sector.

After being at the lowest position, it shows that at this time investment has not fully recovered. However, looking at the predictions from the International Monetary Fund (IMF) for the Indonesian economy in 2021, it gives a positive view, where the growth of Indonesia's Gross Domestic Product (GDP) in 2021 will be at 4.8%, greater than 40 basis points (bps). In revitalizing the program's credibility from the implementation of MSMEs, the government has prepared many policies in an effort to deal with the economy that must strengthen, both in financial stability, encouraging international trade, expanding employment opportunities as well as sustainable economic growth. Therefore the Minister of Cooperatives and Small and Medium Enterprises. Teten Masduki revealed that the priority was on innovation, digitization, and certainty for Micro, Small and Medium Enterprises (MSMEs). So it was recorded that in 2020 there were already 10.25 million or 16 percent of MSMEs connected to the digital ecosystem of the real MSME population (HAI Editor, 2020).

Kulon Progo as one of the districts in the DIY region still has the problem of high poverty rates. However, since the leadership of Dr. Hasto Wardoyo, Sp. OG (K) as the Regent of Kulon Progo, various development innovations have been aimed at reducing these problems. Previously, the existing disparity had placed this district as the key holder of the lowest Human Development Index (HDI) in the DIY province. The Kulon Progo Regency Government has compiled community empowerment programs in various sectors to enable this district to be able to improve the community's economy. The Bela Beli Kulon Progo program (2013) has become the district's brand, making it quite popular in the national arena as a successful community empowerment strategy. These programs include: 1) changing Raskin (Rice for the Poor) to Rasda (Regional Rice), 2) developing bottled drinking water products "Air-Ku", 3) developing batik "Gebleg Renteng" 4 and 4) developing shops Belonging to the People (Tomira). Since the program was launched, the poverty rate has decreased from 23.31% (2012) to 18.30% (2018).

Therefore, in preparing and considering industrial transformation in the economic sectors, in this case MSMEs, it is important to enable the readiness of human resources from business actors in mastering the use of digitalization. This includes where MSMEs do business with new methods that are not conventional anymore. Good human resource development is able to be adequate in developing quality skills as business capital in accommodating the needs of new jobs and jobs that will change.

This study aims to review community activities on socio-cultural, technological, mutual cooperation and political changes in Kulon Progo "bela-buy" products with a high "nationalist and idealistic" spirit. So that it is expected to be able to master all good digitization models in improving the performance of Micro, Small and Medium Enterprises (MSMEs) in Kulon Progo.

## B. METHOD

This study uses a qualitative method with a hermeneutic phenomenological design (Fuster, 2019). Hermeneutic research was conducted empirically by collecting observer and reflective experiences (content analysis). Data collection used the method of describing the observer's personal experience, in-depth interviews, observation, document analysis, and conducting focus group discussions (FGD). The data above will be analyzed using triangulation by deepening in the realm of etic, emic, hermeunetic and forming levels of structural patterns.

This method is most appropriate for investigating organized, interactive and systemic social facts that supports three aspects that will be studied based on scientific rationality: 1) empirical-analytic, 2) critical theory, and 3) hermeneutical-phenomenological. The following is a list of informants who have the capacity to be research objects with the initials:

1	Eko Wisnu Wardhana, S.E.	Kepala BKAD Kulon Progo	Male	Interview
2	Iffah Mufidati, S.H., M.M.	Dinas Perdagangan dan Perindustrian	Male	FGD
3	Saifuddin	Owner UMKM <i>Handy Craft</i>	Male	Interview
4	Achamad Suyadi	Owner UMKM Kriya	Male	Interview

## C. RESULTS AND DISCUSSION

### 1. Vocational Education in Kulon Progo

Presidential Instruction No. 9 of 2016 concerning Vocational Revitalization is intended to improve the quality of Vocational High Schools. The hope is that the Presidential Instruction will be a solution to the issue of high unemployment (vocational school graduates reached 20.76%), incompetent vocational school teachers (22.3%), lack of equitable access to vocational education, lack of infrastructure and facilities for providing vocational education, political, social, and economic conditions. economic and cultural conditions that are not conducive and the lack of relevance of the curriculum to the world of work. The issuance of Presidential Instruction 9/2016 has encouraged changes in the alignment between the supply (supply) of graduates of vocational/vocational education and the demand (demand) for labor from the world of work. Based on BPS data, in early 2020 the open unemployment rate (TPT) decreased from 5.01% in February 2019 to 4.99% this year. The decline occurred in TPT at all levels of education. The highest TPT is vocational high school (SMK) at 8.49%. TPT Diploma I/II/III amounted to 6.76% and 5.73% University.

In addition to the implementation of vocational education carried out by SMK and UNY during the period 2013-2020, the Kulon Progo Regency Government actively organizes training for small and medium industries (IKM). Kulon Progo Regency which has a population growth rate of 1.18%. The potential demographic bonus will also support the development of this area if it is managed properly. The

expertise of the vocational community in Kulon Progo Regency, the workforce aspect can be trained for three months to produce good work. Of course, this cannot be separated from the industrial potential that is open to the people of Kulon Progo, in 2019 for industries that already have permits in the food processing sector, there are 218 units, the clothing and leather sector is 41 units, the chemical and building materials sector is 18 units, and the metal and service sector reached 56 units, and the craft and general sector reached 43 units. From this it provides job opportunities for the people of Kulon Progo..

## **2. Use of digitization in business**

The choice of innovative technology and use at this time is able to bring new progress to business, especially MSMEs in the midst of a pandemic. The existence of a digitalization process is able to create best practices and empower agents for digital transformation (Sayabek & Suieubayeva, 2020). As is well known, the need to study and understand new solutions to economic problems with respect to digitalization is certainly a big task, one of which is being able to adapt to changes in the world and innovations at the center of digital technology and the surrounding digital business model (Kotarba, 2017; Omid, 2020). Actually, regardless of any activity related to "digital", as a business actor must be able to have activities that are aligned and adapted to each company's individual business model (Kaplan, 2019; Amit, 2012; Osterwalder, 2010; Chen, n2018), so that in global digital readiness emerges as an organizational driver within a "digital" conceptual framework.

When viewed from the point of view of internet use in Indonesia, the results of this study are quite good in supporting the performance of MSMEs. Where the internet helps MSMEs in reaching customers with the highest percentage that there are 60.2% of business actors doing product marketing through social media, and the lowest percentage that there are 27.7% of business actors sending e-mails or instant messages to customers (Pusparisa, 2020) . At this time it is no secret again that online internet is big to do with business today as the main communication and marketing channel as opportunities and relevant information for those who put their goods and services on the market. The convenience associated with e-commerce, the speed of distribution channels, the possibility of global action and an effective marketing tool for promotion, so that trade as a relevant sales channel is now almost debatable, so it is important for now and the future (Federko, 2014).

Based on the data above, the number of the labor force tends to increase in line with the increase in labor absorption in various business sectors. The following is the data for the 2016-2019 BLK training in Kulon Progo.

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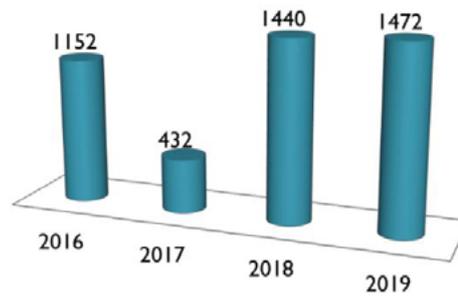


Figure 1. Distribution of HR quality improvement through training in BLK.

Table of training distribution for improving the quality of human resources in Kulon Progo.

No	Sub Vocational	2017		2018		2019	
		Package	Person	Package	Person	Package	Person
1	Industrial Welding	8	128	1	16	5	80
2	Production machine	2	32	-	-	1	16
3	Domestic Air Conditioning	5	80	2	32	3	48
4	Furniture And Furniture	4	64	1	16	4	64
5	Wood Construction	4	64	-	-	3	48
6	Technical light vehicle	4	64	2	32	2	32
7	Motorcycle Engineering	6	96	2	32	4	64
8	Basic Sewing	6	96	3	48	3	48
9	Embroidery Technique	4	64	-	-	3	48
10	Rias Penganten	3	48	2	32	3	48
11	Bridal makeup	2	32	-	-	3	48
12	Technical Support	2	32	-	-	2	32
13	Telecommunication	3	48	3	48	2	32
14	Office Tools	4	64	2	32	5	80
15	Desain Grafis	3	48	1	16	7	112
16	Agricultural Product Processing	11	176	7	112	16	256
17	Engineering Design	1	16	-	-		0
18	Teknisi Show Case	-	-	1	16	2	32
19	English	-	-	-	-	8	128
20	Advanced Sewing	-	-	-	-	2	32
21	Airlines Staff	-	-	-	-	2	32
22	Ticketing And Reservation	-	-	-	-	2	32
23	Aviation Security	-	-	-	-	2	32
24	Ground Staff	-	-	-	-	2	32
25	Cargo Staff	-	-	-	-	2	32
26	Cleaning Service	-	-	-	-	1	16
27	Mosaic Stone	-	-	-	-	1	16
	Amount	72	1152	27	432	90	1440

The contribution of this research provides the practice of community life which is based on the entrepreneurial spirit of youth, mutual cooperation, high gratitude, the role of OPD from villages to districts to move the buying and selling of Kulon Progo. The expertise of the vocationalization community in Kulon Progo Regency, the labor aspect can be trained for three months to produce natural fiber crafts, batik, and handy crafts to penetrate the global market. The unique finding is the results of identical crafts to be developed into a tourist village that can be juxtaposed with tourism potential, creative crafts, and local education. The practical contribution of this research shows that praxis is dominated by the persistence of the youth community to continue to be creative, the role of pentha helik, international language communication, mutual cooperation, and the use of technology that highlights strong village vocational story telling. The implications of this research study provide knowledge of the role of technology, creativity, mutual cooperation and commitment to social entrepreneurship to have an impact on people's happiness and welfare.

#### **D. CONCLUSION**

Based on the research conducted, it can be concluded that community vocationalization has had good knowledge during the entry of the Covid-19 pandemic in Indonesia. Where they are able to take advantage of digital facilities and infrastructure that can revive the MSME economy during the pandemic. The public has also been aware of and continues to exercise control in efforts to improve the implementation of MSME businesses for the past year since the Covid-19 pandemic. Balanced on systems and regulations in implementation by business actors, the use of digitalization greatly supports the achievement of targets and causes an increase in various focus areas in the business economy which can be fully managed by MSMEs themselves. However, from the renewal and implementation process, business actors still have not fully mastered the implementation of digitalization, so there are still people who have to get out of their comfort zone and set strategies in development to improve sales quality in utilizing the current digital era. Non-formal TVET training is able to provide service contributions, employment capabilities, and holistic understanding. The happiness of the people of Kulon Progo is obtained by sharing mutual cooperation, a culture of mutual respect, and a sense of inner and outer gratitude. Tireless work makes a pattern of life that enjoys the essence of life for a living.

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**BACK**

# **Research on Personalized Teaching Management in Higher Vocational Colleges Based on Contingency Theory**

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## **Abstract**

Contingency theory holds that there are no methods applicable to any situation. That is to say, different method for different situation in management activities. With the transformation of talented persons' cultivating objective, the adjustment of student source structure and school running pattern, and the construction of internal governance system in higher vocational education, the traditional mass, unified and fixed teaching management model is constantly being questioned. Personalized teaching management has become the tendency of higher vocational education reform and development, which specifically reflected on the following aspects: 1.The transformation of traditional mass teaching management to appropriate teaching management. 2.The transformation of traditional unified teaching management to diversified teaching management. 3.The transformation of traditional fixed teaching management to dynamic teaching management. The implementation of personalized teaching management in higher vocational colleges is of great significance to realize the return of educational value, promote the optimization of internal governance pattern and improve the adaptability of higher vocational education.

**Keywords-** Personalized Teaching Management; Higher Vocational Colleges; Contingency Theory

Students are the subjects of educational activities. They have different development potentials and learning needs. Influenced by the traditional management culture, current higher vocational colleges generally follow the "top-down" operation path, which leads to much talented persons' cultivating work not based on the students' development potentials and learning needs, but often replace the students' learning wills with the teachers' teaching objectives and managers' management

objectives in the actual process. With the transformation of talented persons' cultivating objective, the adjustment of student source structure and school running pattern, and the construction of internal governance system in higher vocational education, the traditional mass, unified and fixed teaching management model is constantly being questioned. Personalized teaching management whose ultimate purpose is not to facilitate and unify management activities, but to provide customized learning supports and services for students has become the tendency of higher vocational education reform and development. Based on the contingency relationship between environmental variables and management variables in contingency theory, this paper deeply analyzes the principles that should be followed by personalized teaching management in higher vocational colleges, and provides implementation technologies for personalized teaching management in higher vocational colleges.

### ***I Contingency theory: the theoretical basis of personalized teaching management in Higher Vocational Colleges***

Contingency theory holds that the internal elements and external environmental conditions of each organization are different, so there are no principles and methods applicable to any situation in management activities, that is to say, we should seek different management modes, schemes or methods which are also the most appropriate ones for different management situations according to the internal and external conditions of the organization.<sup>[1]</sup> Fred Luthans, F. Fiedler and R.J. Howse are the famous representatives of this theory.

The contingency relationship model constructed by Fred Luthans holds that the relationship between environmental variable and management variable is not a causal relationship, but a hypothetical relationship.<sup>[2]</sup> If under certain environmental conditions, we can find the most effective management method suitable for this environment. In other words, under complex environmental variables, the management mode is not unique but diversified. Similarly, under a single environmental variable, the management mode is also not unique. There is always a management method that can achieve the goal more effectively than this management one. The contingency theory advocates dealing with various management problems randomly according to different organizational structure factors in the organizational environment, which is more descriptive and expressive to personalized teaching management. Specifically, the relationship between student variable and management variable is also not a causal relationship, but a hypothetical relationship (see Fig.1). The personalized teaching management in higher vocational colleges should follow the principle of appropriateness.

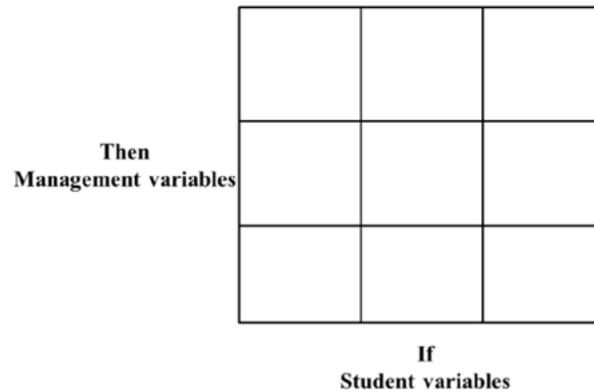


Figure 1. Contingency relation framework of personalized teaching management

Since then, contingency theory has developed in depth. Based on the research of Fred Luthans and other scholars, the contingency relationship is in static equilibrium which analyzes the matching relationship between organizational management variables and environmental variables at a single level, while many other variable factors are ignored. Lex Donaldson introduced organizational strategic factors in 1987 to build SARFIT (structural adjustment to regain fit) model (see fig. 2), which reveals the internal mechanism of dynamic balance between organizational structure and contingency factors.<sup>[3]</sup> SARFIT model explains that the change of organizational strategy will lead to the mismatch between organizational structure and contingency factors, which will reduce organizational performance, and low organizational performance will drive the adjustment of organizational structure to improve the matching degree with contingency factors and improve organizational performance again. According to this contingency theory, the contingency relationship between student variables and management variables is also not in static equilibrium, but in dynamic equilibrium. The personalized teaching management in higher vocational colleges should follow the principle of dynamics.

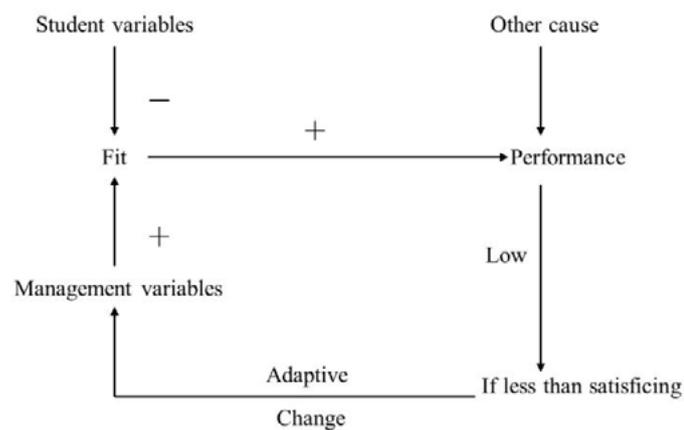


Figure 2. SARFIT model of personalized teaching management

At the same time, the application scope of contingency theory continues to expand which breaks through the scope of organizational structure and widely used in many management fields such as leadership mode. For example, F. Fiedler proposed the contingency model of leadership effectiveness. He believes that any form of leadership can be effective, the matching degree between leadership style and specific organizational situation are the critical factors. Following F. Fiedler's contingency theory of leadership effectiveness, R.J. Howse put forward the path-goal leadership theory. This theory is based on the expectation theory, which holds that the follower always acts according to the expected reward. If they believe that what they want to do will be rewarded, and the reward is what they pay attention to, they will work hard. As a leader, he needs to analyze different needs of the followers and make corresponding adjustment to the leadership mode, so as to encourage the followers to actively participate.<sup>[4]</sup> Under the million enrollment policy, the types of students in higher vocational colleges are diversified and complex, the students have differences in interests, ability basis and development goals. Therefore, the personalized teaching management in higher vocational colleges should follow the principle of diversity to provide diversified growth pathways for these different types of students.

## ***II The implementation technologies of personalized teaching management in Higher Vocational Colleges***

Management is service. The ultimate purpose of management is not to facilitate management and unify operation, but to provide students with customized learning supports and services, so as to make students become "learning subjects" from "educational objects".<sup>[5]</sup> In addition, the development of science and technology and the transformation and upgrading of society put forward new requirements for the cultivation of developmental, compound and innovative technical talents in higher vocational education, the types and developments of students in higher vocational education are constantly diversified, the learning time and learning space of higher vocational education are constantly open and the teaching governance modes of higher vocational colleges are constantly modernized. Therefore, how to realize the matching between the supply of teaching management services and the diversified, personalized learning needs of students is a critical problem for higher vocational education under this theoretical and practical development background. According to contingency theory, the implementation of personalized teaching management specifically reflects on the following aspects:

### ***i The transformation of traditional mass teaching management to appropriate teaching management.***

Contingency theory opposes a single management method used for different situations, and advocates appropriate and reasonable management methods to effectively achieve the goals of different organizational structures and organizational members. Correspondingly, personalized teaching management in higher vocational colleges also needs to deal with the contingency relationship between management variables and students' individual variables, analyze and understand the learning abilities and learning needs of different students, so as to provide different personalized supports and services.

The traditional mass teaching management is a prescriptive model. It specifies the talented persons' cultivating programmes according to the majors. In such management model, the selection of majors is difficult to reflect the real wills and abilities of students. While the appropriate teaching management is a descriptive teaching management model. It customizes individual learning programmes according to students' interests and abilities, emphasizes on an open management. For example, In such management model, student's major determination changes from "admission" to "graduation". That is, in the enrollment stage, students are allocated according to the category of specialties. After enrollment, students plan their career development according to their interests and abilities, and formulate and timely adjust personal learning programmes. After the expiration of the study period, higher vocational colleges shall identify the majors that students graduate according to the courses they study and the requirements of talented persons' cultivating programmes for specialties. In addition, curriculum organization mode changes from "specialty unit" to "curriculum supermarket". Curriculum supermarket which breaks the shackles of specialty in course selection uses the business philosophy of "commodity supermarket", that is to say, the school provides "course library" and students autonomously choose the courses to learn for their interest. Finally, students will be granted the diplomas or qualifications of corresponding specialties according to the courses students have learned. All in all, personalized teaching management in higher vocational colleges provides students with autonomy to select their appropriate majors and courses through a free learning environment, so as to promote students' personalized development.

***ii The transformation of traditional unified teaching management to diversified teaching management.***

The complexity and multidimensional nature of environment and organization are the critical attributes affecting matching. From the perspective of configuration, organizational design needs to pursue multiple goals and a variety of feasible design schemes in order to meet the requirements of different tasks, different technologies and different members. Similarly, if higher vocational colleges adapt to the personality characteristics of different students and promote the diversified development of students, they also need to create a rich and diversified teaching management

environment, such as diversified talented persons' cultivating programmes, diversified teaching modes, diversified evaluation contents and methods, etc.

Especially under the current million enrollment expansion policy, the student source structure of higher vocational colleges is constantly diversified, the teaching management of higher vocational colleges faces to the students with different educational backgrounds, different experience levels, different learning abilities and different value pursuits. Therefore, the traditional unified teaching management can't meet the needs of all students. It needs diverse cultivating programmes and learning conditions for students. For example, in the light of different knowledge and ability bases and different learning objectives of students, the higher vocational college could provide diversified growth pathways for these different types of students by diversified talented persons' cultivating programmes, diversified evaluation contents and methods. In terms of learning conditions, the learning mode could change from single face-to-face learning to online and offline mixed learning. The learning place could change from single classrooms in schools to combination of inside school and enterprise spot. The learning time could change from single, fixed arrangement to multi arrangement. All in all, personalized teaching management in higher vocational colleges expands students' choice space and enriches students' development pathways through rich and diverse learning environment, so as to promote students' diversified development.

### ***iii The transformation of traditional fixed teaching management to dynamic teaching management.***

The effective operation of the organization requires not only the internal matching of organization structure, but also the matching between organization structure and external environment. If the external environmental factors change, the organizational structure design will also change, and it will further affect the internal matching of the organizational structure. Therefore, there is no invariable mode or method of teaching management in higher vocational colleges. It depends on the environment of social development. If the external factors of social environment change, teaching management in higher vocational colleges will also make some dynamic adjustments. Meanwhile, it should keep dynamic balance with students' individual needs through positive interaction.

The traditional fixed teaching management is an input management model, which emphasizes the control of input investments, such as learning content, learning time, learning resource and learning place, etc. While the dynamic teaching management is usually an output management model, which emphasizes the management of actual learning outcomes that the students have achieved. Learning outcomes are not only important indicators to reflect the employment demands of labor market, but also important tools to measure the effectiveness of students' personalized learning. Since

learning outcomes have the characteristics of unity, hierarchy and connectivity, they have the functions of certification of non-formal and informal learning outcomes, transformation of the same or similar learning outcomes and accumulation of learning outcomes obtained in different learning time. Therefore, personalized teaching management in higher vocational colleges which adheres to outcome-orientation for goals setting, curriculums and evaluation methods design enriches students' learning ways and makes learning time flexible, so as to promote students' sustainable development.

### ***III The significance of personalized teaching management in Higher Vocational Colleges***

Personalized teaching management refers to that schools guide every student to customize the respective learning programmes according to his or her personality potential and value tendency, and organize teaching resources, teaching forms and teaching methods for the teaching process according to certain management principles, procedures and methods, so as to meet every student's personalized learning need and promote student's personalized development. The implementation of personalized teaching management in higher vocational colleges is of great significance to realize the return to the value of education, promote the optimization of management mode and improve the social adaptability of higher vocational education.

#### ***i It is conducive to the return to the value of education***

Human beings are not tools of society, but the subjects of their own and social development.<sup>[6]</sup> If modern education falls into the quagmire of utilitarianism, it will lose its natural dignity. Meanwhile, if the value of practical knowledge and technology are recognized only, people will be slaves of knowledge and technology. Students are not only the objects of teaching activities, but also the subjects of their own development. Personalized teaching management in higher vocational colleges will take the subject value of students as the logical starting point of teaching management activities, fully respect the unique life existence of students, and provide the most suitable education according to the individual differences in innate heredity, learning interest, learning habit, subjective effort, thinking mode and development needs, etc. Implementing personalized teaching management in higher vocational colleges is conducive to the return to the value of education.

***ii It is conducive to the improving the internal governance level of higher vocational colleges***

Human beings are autonomous existences, and their obligations are borne by themselves. These obligations formed from human beings' intuitive consciousness and the sense of responsibility, not from external pressure. Autonomy is the existence way of individual life. As the subjects, students have the initiative of self-development. As early as the Humboldt period in Berlin University, students' learning was based on the principle of freedom, and students enjoyed great freedom in course selection, learning progress and so on. The students of higher vocational colleges in China come into adult. They have certain sense and ability of autonomy. Therefore, implementing personalized teaching management in higher vocational colleges is conducive to creating a loose and democratic management ecology and improving the internal governance level of higher vocational colleges. Students under this management mode could freely choose what to learn, decide what time to learn and how to learn.

***iii It is conducive to the improving the adaptability of higher vocational education***

The relationship between social demand and talented persons' cultivating is always in a dynamic and flexible coupling state. Higher vocational education must better adapt to socio-economic changes and better conform to learners' wishes and abilities. At the same time, higher vocational education must also provide more equal opportunities.<sup>[7]</sup> Obviously, the traditional mass, fixed and unified teaching management mode in higher vocational colleges has gradually failed to meet the cultivating objectives and requirements of developmental, compound and innovative talents. Teaching management mode in higher vocational colleges needs to keep balance between serving the current regional economic development and promoting students' own development. On the one hand, higher vocational education should be employment oriented to meet the needs of current labour market. So personalized teaching management in higher vocational colleges is conducive to meeting the needs of students' comprehensive learning and overall development. On the other hand, personalized teaching management in higher vocational colleges is also conducive to providing a platform for students' lifelong learning and sustainable development.

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# The Manifestation of Music and Its Facilitation to Occupational World

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## Abstract

**Introduction:** Nowadays, music is indispensable to people's daily life experiences and the influence of environmental music is widely used in different fields. When music arouses strong emotional experiences, it also constructs a unique musical experience, which indirectly affects the development of brain, body and feeling. Environmental music not only evokes the change of emotion, but also prompts specific performance in various fields. Most published studies have concentrated on the impact and effectiveness of environmental music. Using environmental music to create a specific atmosphere which directly or indirectly affect people's reactions and behaviours. Although the findings of these studies have been mixed, music is seen as a tool to promote positive benefits or effectiveness. Music is regarded as a medium with functional connections, which unnoticeably affects people's behaviour in life. Through specific environmental field atmosphere and selected music styles, it is easier to integrate into the vocational field experience through environmental music. This study is purport to develop application of harmony in occupational field in music performance and evaluated the effects of environmental music on a variety of work-related behaviours.

**Methodology:** This research adopts systematic documentary analysis as research method. By using secondary data from a database published by ScienceDirect (SDOL), current research focuses on the influence and function of environmental music to the occupational field.

**Results:** Environmental music has its purpose and function according to different work field. Music is the production of personal expression of inner feelings and

emotions. Environmental music begins with the society, enhancing the feel and strengthening specific atmosphere. Environmental music is used widely and subconsciously in modern society, with great effects and influences, In workplace, the use of environmental music can effectively change emotions, thoughts, attitudes and interactions between people.

Through its influence, the following three conclusions of environmental music functions are: (1) Environmental music is both the mood stabilizer and retardants, helping to alleviate negative emotions. People in the field with environmental music regulate and stabilize their emotions. (2) Environmental music has the function as the enhancement of moods and emotions, which induces specific emotions or a specific state. (3) Environmental music is a mediator of the occupational field. It helps people get involved with social activities, enhancing expressing emotions and interpersonal relationships. It promotes more connectivity and relevance to the vocational environment.

**Keywords:** Environmental music, the effect of music, occupational world

## 1. Introduction

Ray Charles, a legendary musician, during the 1950s who pioneered the genre of soul music, once said “Music is powerful. As people listen to it, they can be affected. They respond.” (Petree, 2020, chap.6). Music, as an universal cultural phenomenon, expresses the psychological needs and emotions of human beings. With the auditory and abstract artistic characteristics, music is the art of time. It shows a great influence on individuals, groups, and society, such as emotional expression, dealing with stress and pressure, reducing negative feelings, creating a specific environment atmosphere. Therefore, at all times and in all countries, the connection between music and people's lives are inseparable. A variety of music styles and functions were created, in order to meet the needs of different situations and occasions.

Some archaeologist pointed out that music has existed since prehistoric times more than 55,000 years ago. Some musicologists said that music originated from nature and the nature song of life has been sung in various forms, as the sound of air, the gurgling sound of river, the thundering sound of waves of the sea, the lighting sound of clouds (Diwase, 2018). No matter which one is the origin of sound, they all reveal the multifaceted characteristics of music, making people's life more harmonious.

Music plays an important role in our daily lives, affecting all levels of physical, psychological and spiritual. Within the specific surroundings, as the environmental field changes, music indirectly creates different feelings, triggering conscious or subconscious musical perception at the same time.

After listening to different styles of music, listeners experience the appeal and guidance in the musical situation. By changing or transforming the primary attention and emotions, listeners in the field gradually change their behaviour or state. In other words, through the universality and similarity of music, listeners can be affected in all levels. For instance, when listening to dynamic music, listener's heartbeat speeds up, can't help but want to follow the beats to do some rhythmic movements. When hearing the melody of theme song, our mind is likely to come up with various images of imagination or impressive plots, even further to evoke personal memories and experiences (Bai & Kawagoe, 2018).

According to different functions of the field, music diversified applications has been developed, including daily life, cultural development, society, workplace, commercial, learning (Motoki, Takahashi, Velasco, & Spence, 2021; Ausín, Bigne, Marín, Guixeres, & Alcañiz, 2021; Hwang & Oh, 2020). Based on the purpose, music is used in all areas, it helps people to relieve one's feeling and stress, overcome internal frustration, increase positive thoughts, boost economic activities, cultivate aesthetics and so on, mainly to create a stimulating but gentle, no-pressure environment.

## **2. Specific Objective**

Studies have demonstrated the influence and correlation between music and emotions, which is directly or indirectly affect people's performance. Although the effects of music on human performance have been studied across many disciplines, the application of environmental music in the workplace is rarely be discussed and have not yet been fully realized. Therefore, current research aims to review the manifestations and the functions of environmental music, mainly to construct a research field. By analysing relevant literature, this study indicates the models, application, potential influencing factors and the effects of environmental music.

## **3. Methodology**

This research adopts systematic documentary analysis as research method. By using “background music”, “environmental music” and “workplace” as keywords, secondary data from a database published by ScienceDirect (SDOL) were collected. Related literature data are screened and analyzed as the model of theoretical framework of environmental music. In order to understand these disparate documents, current research summarizes some representative key studies about the affects and impacts of

environmental music of work-relevant outcomes.

## **4. Findings**

### **4.1 The Manifestation of Music**

Music exerts a powerful influence on human beings, not only reveal the beauty of the sound, but also be widely used in many fields. At the same time, music contains the value of aesthetic and society function. Further more, environmental music connects music itself and life into more in-depth application. According to the features of the activities, music can achieve or even enhance the efficiency in a workplace by playing environmental music with certain style, instruments, rhythm and speed. The function of music has developed gradually from appreciation and cultivation of temperament to a tool for expressing personal emotions and creation. Additionally, music can also evokes strong feelings and influence one's emotions, even can modulates activity in brain structures (Koelsch, 2014).

Despite the science of environmental music is inconclusive, music is popularly recognized to affect human factors such as mood, performance, and intelligence development. The impact of music has been examined in variety of research areas, subjects, and contexts. For instance, music is oftentimes referred to as a “language of emotion” and can be used as the function of automatic emotion recognition (Kim et al., 2010), there is an assumed link between music and facilitating learning via cognitive and emotional dimension (Li, Hu, & Que, 2020), and music interventions has indicated positive effects on a variety of skills, having further potential to support educational processes and development of children (Dumont, Syurina, Feron & van Hooren, 2017).

In the 1960s, Japanese scholar Tadashi Hattori put forward the concept of environmental music, focusing on the nature of music itself and the promotion the harmony of the environmental music (Hattori, 1991). Subsequently, other foreign scholars started to study the function and effect of environmental music in various application, such as workplace, industrial field, social gathering.

Since environmental music is used for specific environmental fields, it is mostly classified according to the different fields of use. The usage of environmental music can be unified into: (1) daily life use, to remove impetuosity, exhaustion and discomfort (2) commercial activities, to create a consumption environment, increase marketing, and raise economic efficiency (3) industrial application, to eliminate boredom and fatigue, improve work efficiency and boost worker enthusiasm (4) leisure and tourism, to increase the cultural characteristics of tourist attractions, and for the hotel service to provide inner comfort and warmth, in order to build close

personal relationships with guests (5) Transportation, to lower tension and waiting anxiety and keep peace of mind (6) Medical treatment/ nursing, to reduce the patient's tension, and at the same time relieve the medical staff (7) Social occasions, to create a specific atmosphere, such as wedding banquets with live singing and music performance, negotiation and communication with others, pop music and folk music for entertainments (8) School activities, to promote a relaxed and delighted atmosphere for learning, to improve learning effects, to improve the powers of concentration and attention.

According to Zhao and Chen (2020), environmental music can be divided into two aspects. One is based on acoustics, music theory and music psychology, focusing on the function of accompaniment or soundtrack, to reach a certain emotional resonance. The other is study the effect of applied environmental music and its functions, to create an atmosphere suitable for the indoor environment.

As noted above, according to the influence, the function of environmental music can be classified into three categories: (1) Mood stabilizer and retardants: mainly to increase emotional stability, and help to regulate negative moods, eliminate impetuosity, exhaustion and discomfort. (2) Mood accelerant and promoter: By increasing positive emotions through music, it can improve labor efficiency, work efficiency, learning efficiency and performance. (3) Creating a special atmosphere for a specific field: to help people express their thoughts, have communication and interaction with each other, and promote interpersonal interaction.

## **4.2 Music Facilitation to Occupational World**

Since ancient times, human beings have integrated music into the workplace for thousands of years. With the era of continuous change, music styles have developed into various forms and genres, which get involved with diverse workplace and deeply effected people in all aspects. Despite the development of music has improved rapidly with different focus, music continues to bring comfort and relief to people of all professional fields. Music is inherently involved with moods and emotions. Therefore, moods and emotions are considered to be essentially related factors in the workplace (Ashkanasy & Dorris, 2017; Elfenbein, 2007).

Music is universal – every human culture has some similar form of environmental music – but in different way to express. Environmental music which is used in occupational world can be traced back to work song, one of the most common workplace music. In the old days, the appearance of work song is mainly to regulate worker's fatigue, increase their enthusiasm to work and to invigorate their minds through active rhythm and speed change (Pickering, Robertson & Korczynski, 2007). Researcher believes that work songs can be regarded as the predecessor of the development of workplace music. In spite of the long history of work songs, the

concept of using environmental music in workplaces did not begin until the twentieth century (Prichard, Korczynski, & Elmes, 2007).

In the 1930s and 1940s, companies in the United States and the United Kingdom played environmental music for workers to listen to, in order to stimulate workers' enthusiasm and interest for the mechanized, boring and stressful work in factories. This industrial-organizational psychology of studies on music played is referred as "industrial music" (Landay & Harms, 2019). Although many "music at work" have been recorded in the early days, the concept of environmental music did not bring out until the postmodern society. The idea that music alters work performance is not new, empirical research to date have been studied the effects of music in all disciplines and with different variables, such as psychology, learning, marketing, and music therapy. But so far there is no exhaustive academic theory and certain classification for environmental music in workplace. This, then, is a critical limitation for the application of environmental music to the vocational field.

Environmental music is widely regarded as the mediators of mood and emotion. Therefore, when trying to construct an environment with corresponding music, most important of all, is to analyze the work environment as priority. The following points is also need to be considered as the model construction: (1) The compatibility of environmental music and work environment (2) The speed of productivity (3) The time of music playing (4) The background of workplace workers.

#### (1) The compatibility of environmental music and work environment

Understanding the characteristics and needs of the occupational environment is one of the key factors affecting environmental music. Based on the work types and categories, working environment can be divided into manual labor and mental labor.

The former emphasizes productivity of strictness and precision, with mechanical work steps and fast-paced work tempo. In this type of field, lively and rhythmic pop music with a strong beat is recommended to be used. Kniffin, Yan, Wansink and Schulze (2017) even indicated that when the rhythm of the music is consistent with the working speed, forming a harmonious synchronized pace, workers are more conducive to increase work efficiency.

The latter has more flexible and adjustable space on work, and tends to emphasize more on creativity and thinking. In this way, the environmental music focus on the effect of calming, relaxing and relieved. Within slow motion and gentle melody , Classical music and light music are recommended to be used.

## (2) The speed of productivity

The way and the pace of production is also an important factor affecting environmental music. When employee can control their schedule, it usually means that there is more flexibility in the work field. At the same time, employees are more likely to be given enough time and appropriate space to do emotional self-adjustment by themselves through environmental music. Relatively, when in a workplace of collective labor, it's might be more easier to feel the tension, pressure and anxiety in the atmosphere between each other. The environmental music in this case may place emphasis on the change and transformation of emotions.

Radocy and Boyle (2003) divided music into stimulative music and sedative music based on the function. Through the difference in rhythm and dynamic performance, they found that stimulative music can aroused more emotional responses, such as: March, dance music, etc.; while sedative music create more calm and peaceful environment, making people feel comfortable and relaxed, such as: lullaby, etc. Therefore, in occupations with more spatial autonomy, they tend to play sedative music, while in the field of collective labor, it's mainly suggested to play stimulative music.

## (3) The time of music playing

The time to play environmental music is essential. With the passage of labor time, it can be divided into four parts as: before work, during work, between work, and after work. The mode of environmental music is played according to the working state and be used to optimize the environment. Meanwhile, it can create a specific atmosphere in the workplace, such as reminding, adjusting and increasing stimulation.

## (4) The background of workplace workers.

Music with stable speed and lively rhythm facilitates positive vibes, making people more willing to contribute, enhancing professional recognition and cohesion of workplace members (Kniffin, Yan, Wansink & Schulze , 2017). Therefore, it is necessary to consider the age of employee and local cultural background characteristics. Choosing corresponding music in line with the background of the employee's time, or with specific representative functions to strike a chord between listeners and environmental music. Moreover, sharing the same music experiences and background is helpful to build a closer relationship between members, increasing intimacy and interaction in the workplace environment.

## 5. Conclusion and Future Study

In current study, environmental music seems to be a secondary factor in work field, but with a great influence in various aspects. The use of environmental music need be arranged according to the area and complexity of the workplace. To summarize, researcher concluded this study into following points: (1) Music is the production of personal expression of inner feelings and emotions, often present in the use to show joy, admiration, blessing, and sadness, etc. (2) Environmental music started from the society, enhancing the feel of reverence, awe, and admiration in religion. In order to raise awareness of main events, it also used in various kinds of celebrations to build up and strengthen the atmosphere. (3) Environmental music is used widely and subconsciously in modern society, with great effects and influences, such as commercial environment, campaigns and wedding ceremony. (4) In workplace, the use of environmental music can effectively convert emotions, thoughts, attitudes and interactions between people.

And the functions of environmental music are: (1) Environmental music is both the mood stabilizer and retardants, helping to alleviate negative emotions. People in the field with environmental music regulate and stabilize their emotions. (2) Environmental music has the function as the enhancement of moods and emotions, which induces specific emotions or a specific state. (3) Environmental music is a mediator of the occupational field. It helps people get involved with social activities, enhancing expressing emotions and interpersonal relationships. It promotes more connectivity and relevance to the vocational environment.

While the evidence suggests music may potentially have significant value in the workplace, more research is needed to understand how music might be effectively utilized and be used in practice in workplaces.

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# Structure of Vocationalization of Training at UPT BLK Kulon Progo Facing the Era of Eerometrolopis

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## Abstract

The digital revolution is rapidly changing the world of work and the skill profile of many jobs. The pace of change requires ongoing skills and expertise, through lifelong learning. The traditional TVET model which views formal training as a terminal will not prepare workers for the world of work that is constantly evolving in the era of technological transformation. The government of Kulon Progo in realizing the sustainable development of the SDGs (Sustainable Development Goals) is still experiencing obstacles due to poverty and unemployment. It is recorded from data (BPS DIY, 2020) that the poverty rate in the area reaches 17.39% which is inversely proportional to the life expectancy in other districts of 75.2%. The purpose of this research is to investigate the formal, informal and non-formal TVET (Technical and Vocational Education and Training) vocational programs in rural communities that have been carried out and to prepare the workforce capabilities needed to face the aerometropolis era. In investigating this vocationalization, a qualitative approach was carried out with semi-structured interviews with selected participants (purposive sampling). Hermeunetically, various cultural aspects in society contribute to the vocationalization process in this society. This investigation is expected to reveal the cultural process which is part of the social activities of the Kulon Progo community. by observation, interviews, document analysis, and a ground discussion forum. The results showed that the training conducted by the Manpower Office of Kulon Progo Regency from 2016 to 2020 contained 25 vocational fields. Based on interviews and

analysis of both SMA, SMK, and MA, it was found that 43% continued to study in Kulon Progo, 86% worked, entrepreneurship 17%, and attended 19% training. The research contribution is practically knowing the mapping of employment capabilities to optimize the economy. The structure of vocational training at UPT BLK Kulon Progo researchers found three patterns of implementation of vocational education in Kulon Progo Regency, both formal, informal and non-formal categories.

**Keywords:** structure, vocationalization, training, aerometrolopolis, kulon progo.

## A. Background

The turmoil of the COVID-19 pandemic has pushed digital transformation to accelerate the ability to innovate all countries in carrying out life activities in society. Digitization is able to provide best practice, empower community agents for digital transformation (Ziyadin et al, 2020) and provide a conceptual basis for future work in resource management (Strohmeier, 2020). As is well known, the need to study and understand new solutions to economic problems with respect to digitalization is certainly a big task, one of which is being able to adapt to changes in the world and innovations at the center of digital technology and the surrounding digital business model (Kotarba, 2017; Omidi, 2020). As a business actor, you must be able to have activities that are aligned with each company's individual business model (Kaplan, 2019; Amit, 2012; Chen, 2018; Osterwalder, 2010). One of the digital transformation efforts is to encourage micro, small and medium enterprises (MSMEs) which account for 60% of the national gross product (GDP) to enter the digital realm in Indonesia (Kominfo, 2021) including Kulon Progo.

The government of Kulon Progo in realizing the sustainable development of the SDGs (Sustainable Development Goals) is still experiencing obstacles due to poverty and unemployment. It is recorded from data (BPS DIY, 2020) that the poverty rate in the area reaches 17.39% which is inversely proportional to the life expectancy in other districts of 75.2%. The unemployment rate continued to increase by 1.91% in 2019, although it was still low when compared to the average at the provincial level. This poverty factor is influenced by geographical factors and the lack of optimization of the potential of human resources (HR) with local advantages in the village. This unique phenomenon is interesting in the midst of digital disruption turbulence, the VUCA era (Volatile, Uncertain, Complex, Ambigüe), and the aerometrolopolis era. On June 15, 2021, the Yogyakarta Social Welfare Service Research and Development Center held an audience with the Kulon Progo Regency Government to look for strategies to prepare human resources for the aerometrolopolis era (<https://kulonprogokab.go.id/>).

Yogyakarta International Airport (BIY) sectors that encourage industrialization must be quickly followed by changes in the community to think creatively in innovating creative industry products through MSMEs.

The creative economy of small and medium-sized industrial products (IKM) in Kulon Progo Regency in the 2016-2020 period has experienced a significant increase. It is this potential trend that the researcher examines that can contribute amidst the rapid flow of industrialization in the BIY aerometropolis era.

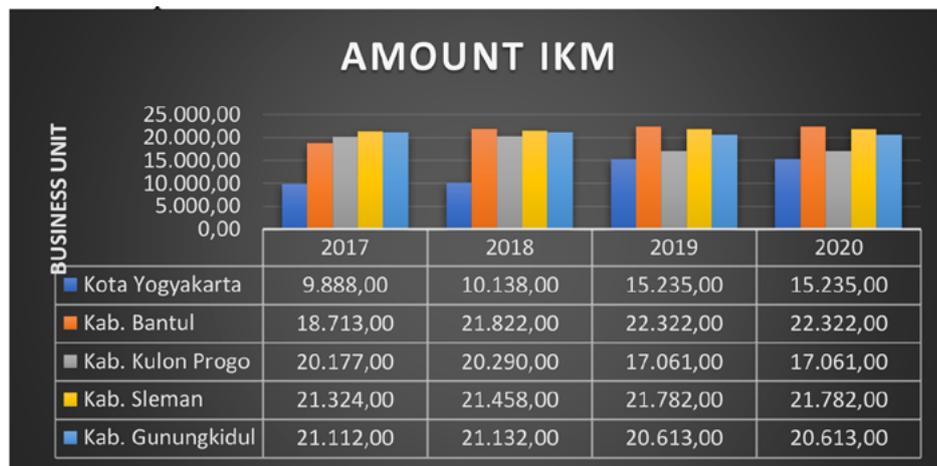


Figure 1. Number of SMIs in each district/city of DIY Province

Source: processed from Bapeda DIY

The (HR) aspect of future development prospects in terms of the number of productive age demographic bonus of 66% should be used as an opportunity, because the momentum of the demographic bonus rarely occurs in the short term. If not, then it poses a threat of a significant increase in the number of unemployed and hampers the productivity of the economy. Based on an audience on June 28, 2021 with the Secretary of State, Bapeda, Balai Dikmen, Department of Education, Youth and Sports of the Kulon Progo Government, it is necessary to immediately study the mapping of the capabilities of the workforce needed, the share of labor that is in accordance with the local context, and the structure of community empowerment to develop a digital creative economy welcoming the era aerometropolis with local culture.

Researchers also observed MSMEs in two sub-districts of Sentolo and Nanggulan during the months of April-June 2021, finding several problems including: 1) people's purchasing power has stagnated and tends to decline (2) requires patience and creativity in creative economic productivity (batik, leather, handicrafts, etc.) and crafts/furniture); (3) it takes a touch of technology to make branding packaging in the form of labeling; (4) need cooperation with local government; (5) need workforce skills capable of promoting in marketing; (6) most still rely on face-to-face sales; (7)

need an ecosystem platform to introduce and sell attractive creative economy products, and 8) need cooperation with the Kulon Progo district government to absorb handicraft production.

The results of an in-depth interview on 28 August 2021-07 September 2021 with Payuban Griya Loka Marsudi numbered eight young people, the potential for creativity and fighting power of human resources and the strength of natural values in the cement and segajih villages that can be sold there are still several obstacles, including; (1) international language communication; (2) creative product presentation; (3) product control; (4) network marketing and (5) policy intervention for products. Seeing this gap, it is necessary to immediately conduct research investigating what kind of vocational community empowerment strategy is to obtain a HR development policy strategy in carrying out activities to run the creative economy in the midst of the aerometropolis flow that does not forget the cultural advantages of Kulon Progo. Creative economy products should become life values that make needs not just materialistic.

## **B. Methodology**

This study uses a qualitative method with a hermeneutic phenomenological design (Fuster, 2019). Based on the research objectives, the research was carried out during 2020-2021 with a qualitative approach with a sample implementation of the Kulon Progo Bela Beli policy. This approach was taken in order to investigate in depth the implementation of the program at the planning, implementation, monitoring and evaluation stages.

Sources of data used in the form of primary data and secondary data. Primary data was obtained by field observations and in-depth interviews with key people and validated by focus group discussions with stakeholders. In depth interviews with key people were conducted with Dr. Hasto Wardoyo, Tejo Regent, Regional Secretary, Head of the BKAD Service, Head of BAPPEDA, Head of Industry and Cooperatives Office, Principal of Vocational Schools, Director of Vocational Studies at UNY. Secondary data was obtained by digging up data from the literature, BPS, and previous research.

Research analysis was carried out in stages. This analysis begins with preparing the interpretation of the results of the in depth interview as a level 1 emic. The second analysis is carried out by compiling a level 1 emic interpretation which has been triangulated as a level 2 emic. The third analysis is carried out by preparing a level 3 emic interpretation after the FGD.

### C. Results and Discussion

BPS data states that the unemployment rate every year experiences a downward trend as follows: 2.81% (2015), 2.81% (2016), 1.49% (2017), 1.14% (2018) and 1.38% (2019). Meanwhile, the number of workers experienced an increasing trend as follows: 72.81% (2015), 72.81% (2016), 73.12% (2017), 75.36% (2018) and 75.32% (2019). The number of workers covers several fields of employment, including: agriculture, forestry, hunting, fisheries, mining, wholesale and retail trade, restaurants and hotels, transportation, warehousing and communication, finance, insurance, building rental businesses, land, and company services. , community, social and individual services (Kulon Progo in Figures 2020). The workforce by education level also shows an increasing trend as follows:

	High school graduate and equivalent	D1/D2 graduates	D3 graduate	S1 graduate
2019	2.971			
2018	2.599	10	243	829
2017	2.226	3	158	699
2016	2.221	3	214	297
2015	2.258	5	203	209

Source: Kulon Progo in Figures 2020, 2019, processed.

Hasil pilah siswa lulus jenjang SLTA tahun 2016-2020

No	School	The number of students	Interest					Take Training
			Working in Kulon Progo	Working in Kulon Progo	Working outside Kulon Progo	Working Abroad	Entrepreneur	
1	SMA	1512	1248	212	136	136	81	82
2	SMK	3055	644	1178	1844	1844	638	674
3	MA	559	324	297	213	213	150	240
	Total	5126	2216	1687	2193	2193	869	996
	Prosentase	43%					17%	19%

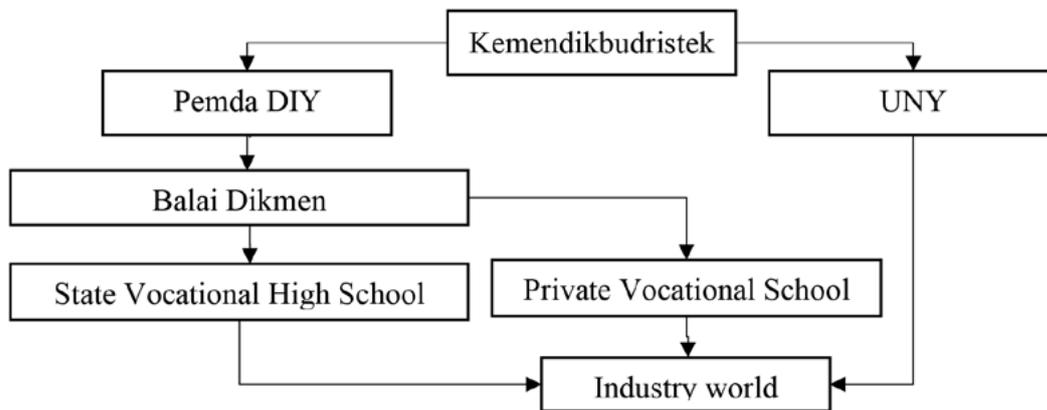
The training conducted by the Manpower Office of Kulon Progo Regency from 2016 to 2020 contained 25 vocational fields. Based on interviews and analysis of both SMA, SMK, and MA, it was found that 43% continued to study in Kulon Progo, 86% worked, entrepreneurship 17%, and attended 19% training. The contribution of research is practically knowing the mapping of employment capabilities to optimize the economy.

### Discussion

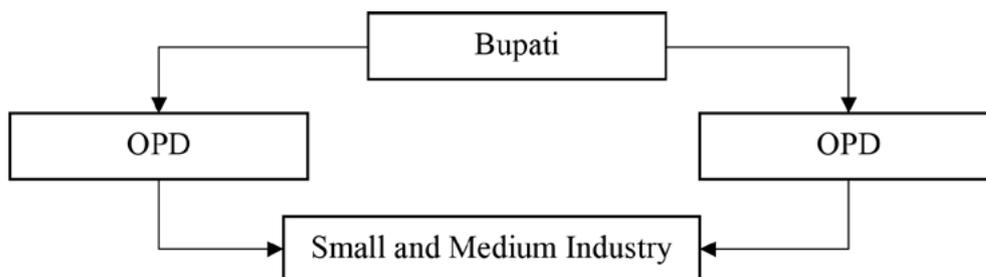
The structure of vocational training at UPT BLK Kulon Progo which has been carried out for 4 months, researchers found three patterns of implementation of vocational education in Kulon Progo Regency, both formal, informal and non-formal categories. The following is a pattern of implementation of vocational

education in these three categories. Lifelong learning, spanning the spectrum of non-formal, informal, and formal learning, will be essential for TVET learners, who will require continuous skill upgrading and re-skills to keep up with industry changes and unpredictable technological advances. Lifelong learning has received increasing attention in the context of the Sustainable Development Goals (SDGs). Jackson (2016) asserts that the informal sector contributes 41% of GDP globally. It is also a major source of non-farm employment in many developing countries. In the informal sector, learning often occurs through social conversation, and friends, neighbors, and other community members are seen as a resource. Several studies have shown that networks and social capital are important elements of heutagogy (Blaschke, 2012).

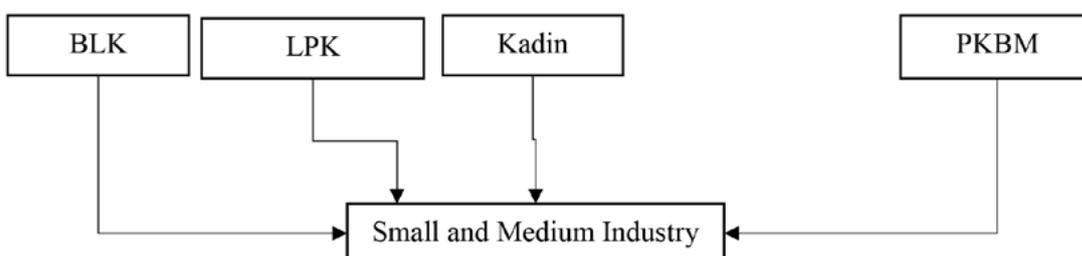
1. Formal TVET.



2. TVET Informal



3. TVET Non Formal



Community-based organizations have an important role in facilitating lifelong learning in TVET for marginalized groups, especially those outside the formal economy and education sectors. Involving students and their communities in content development can empower them and give them a sense of ownership of their own development, which can be a transformative process. Social learning and peer-to-peer collaboration can be facilitated to encourage continuous and lifelong learning.

The contribution of this research provides the practice of community life which is based on the entrepreneurial spirit of youth, mutual cooperation, high gratitude, the role of OPD from villages to districts to move the buying and selling of Kulon Progo. The expertise of the vocationalization community in Kulon Progo Regency, the labor aspect can be trained for three months to produce natural fiber crafts, batik, and handy crafts to penetrate the global market. The unique finding is the result of identical crafts to be developed into a tourist village that can be juxtaposed with tourism potential, creative crafts, and local education. The practical contribution of this research shows that praxis is dominated by the persistence of the youth community to continue to be creative, the role of pentha helik, international language communication, mutual cooperation, and the use of technology that highlights strong village vocational story telling. The implications of this research study provide knowledge of the role of technology, creativity, mutual cooperation and commitment to social entrepreneurship to have an impact on people's happiness and welfare.

## **D. Conclusion**

Digital transformation in the small and medium industry sector in the vocationalization of rural communities relies on the strength of young people who are aware to carry out creativity, fighting power, gratitude supported by the penta helik role with the spirit of buying and selling nationalist souls and high ideals. Skill potential expertise carried out through formal, informal and non-formal TVET training is able to provide service contributions, employment capabilities, and holistic understanding. The happiness of the people of Kulon Progo is obtained by sharing mutual cooperation, a culture of mutual respect, and a sense of inner and outer gratitude. Tireless work is a pattern of life that enjoys the nature of life for a living with formal, informal, and non-formal TVET schemes.

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# **External Quality Evaluation of Higher Education Institutions from the Perspective of "Four Evaluations"**

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## **Abstract**

Evaluation is an approach of quality assurance, and it is also a common way to promote college governance. The "Overall Plan for Deepening Educational Evaluation Reform in the New Era" proposes "improving result evaluation, strengthening process evaluation, exploring value-add evaluation and perfecting comprehensive evaluation". This plan will have a significant impact on the field of education quality assurance. Based on the cognitive view of evaluation and improvement, the improvement of the result evaluation is to perfect the result-oriented connotation construction, the strengthening of the process evaluation is to consolidate the function of the diagnosis and improvement, and the exploration of the value-added evaluation is to activate the endogenous power of the development of the quality subject, while the comprehensive evaluation is to reflect the essence of fair and quality education. Referring to the connotation of the "four evaluations", the current external quality evaluation methods for HVCs (Higher Vocational Colleges) like data collection of students talent training status, annual reports of quality, social adaptability evaluation, and university rankings still need to be improved. In order to promote the "Four Evaluations" reform, the external quality evaluation of HVCs should focus on system design, subject of responsibility, evaluation standard, evaluation team, etc., so that the promotion of

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the quality management of the colleges can be expected, helping the construction of HVCs.

**Key words:** Quality evaluation, outcome evaluation, process evaluation, value-added evaluation, comprehensive evaluation

## 1. Introduction

Evaluation is an approach of quality assurance, and it is also a common way to promote college governance. The "Overall Plan for Deepening Educational Evaluation Reform in the New Era" (hereinafter referred to as the "Overall Plan") which is reviewed and approved at the 14th meeting of the Central Committee for Comprehensive Deepening Reform proposes "improving result evaluation, strengthening process evaluation, exploring value-appreciation evaluation, and improving comprehensive evaluation, and the stubborn diseases of scores only, enrolment only, diplomas only, papers only, and titles only should be eliminated. Meanwhile, a scientific education evaluation system and mechanism which meets the requirements of the times ought to be established" (Comprehensive Deepening Reform Commission of the CPC Central Committee, 2020) The "Overall Plan" is another programmatic document to guide the reform of education evaluation after the 2018 National Education Conference's expression-- "reversing the unscientific education evaluation orientation". The ultimate goal of education evaluation is to improve the quality assurance system and governance ability of colleges, and to ensure the high-quality development of colleges. *National Medium and Long-term Education Reform and Development Plan Outline (2010-2020)* (Ministry of Education, 2010) points out that Education Quality Evaluation and Talent Evaluation System should be reformed". In 2015, *Several Opinions on Further Promoting the Separation of Education Management and Evaluation to Promote the Transformation of Government Functions* (Ministry of Education, 2015) put forward that "government management, higher education running and third-party evaluation should be separated and organic integrated when education administration department is in the process of organizing the evaluation work." In 2019, the *Notice on the Education System Studying and Implementing the Spirit of the Fourth Plenary Session of the 19th Central Committee of the Communist Party of China* proposed to "promote the reform of education evaluation in the new era, and overcome the stubborn disease of scores-oriented only, advancement-oriented only, diplomas-oriented only, papers-oriented only, and titles-oriented only." The "four evaluations" proposed by the 2020 "Overall Plan" is to break the "five only" and to cure the stubborn disease. By reviewing and analysing the policy texts of the development evaluation of higher vocational education in China during the past ten years, it is not difficult to find that education evaluation is the baton for college operation and governing. Horizontally

comparing the external quality evaluation models of vocational education with international developed countries, such as the college accreditation and professional certification-based American model, the quality auditing-based British model and the evaluation and certification-based German model, Chinese higher vocational education external quality evaluation is in the predicament of single evaluation subject, biased evaluation goal, and unclear evaluation process (Tan,2020). Therefore, the approach to drive the reform and innovation of the external quality evaluation model of HVCs based on the "Four Evaluations" values contained in the "Overall Plan", and shift the quality governance from "the dominance of the external evaluation over the internal" to the "integration of internal and external evaluations" will become one of the important contents of the modernization of HVCs' system and capacity for governance under the background of "double-high"<sup>3</sup>.

## **2. Connotation Analysis of "Four Evaluations"**

Educational evaluation is a process based on certain educational values or educational goals. It uses feasible scientific methods, systematically collecting information and analysing, to make value judgments on educational activities, educational processes and educational results. And it also provides a basis for education quality improving and decision-making (Wang,2017). Therefore, we must clarify the value of evaluation at the very beginning. If the "value and goal of education" are not pursued, the nature of evaluation management and measurement will fall into the trap of "human alienation." "Improving result evaluation, strengthening process evaluation, exploring value-added evaluation, and perfecting comprehensive evaluation" of *Overall Plan is the direction of the value and goal in the field of education evaluation in the future. Only by clarifying its connotation can we effectively guide the reform of quality governance in HVCs.*

### **2.1 Improve Result evaluation, Perfect Result-oriented Connotation Construction**

The meaning of the word "evaluation", in simple terms, is to judge its value. Outcome evaluation means it takes results as the standard and orientation. If education does not emphasize results, it will deviate or weaken the value of its existence (Zhou, Yuan, 2020). However, it is necessary to judge the scientific and comprehensiveness of the results once they are regarded as the reference. The essence of result evaluation is to judge the efficacy of education, scores, enrolment rate, number of published

papers which are all measurable, comparable, explicit and rigid indicators of a college. While They are also the main criterion for evaluating the effectiveness of colleges for a long time (Xu, Wang, Ma,2020). This leads to the phenomenon that the evaluation of education quality or effectiveness presents measured things only instead of what we value (Gert Biesta, 2019). "Breaking the Five Only" does not mean abandoning all. Scores, enrolment, diplomas, papers and titles represent abilities. The purpose of improving the evaluation of results is to promote the content and form of evaluation to be more scientific and valid, to ensure that the process of result generation is fairer, and to emphasize the actual productivity value within the results. Therefore, the form of evaluation "outcome" should be the numbers of high quality (for example, focusing on landmark academic achievements), while the method of evaluation also requires experts' integrated comments based on quantitative data and evidence. Improving evaluation of student dimension means the achievements are not traditional outcomes like test scores, but what students can do, learn, show or know after completing their studies. Colleges' commitment to quality requires that they must set clear goals for students' scores and measure performance with these goals, match the needs of society, report evidence of success regularly, then, colleges ought to strive to improve outcomes continuously. Valid Assessment of Learning in Undergraduate Education (VALUE) is a project of Association of American Colleges & Universities, practically exploring this principle (Association of American Colleges & Universities, 2020). Thus, the improvement of result evaluation will jointly improve the goal setting, process attention, result generation, evidence collection, and value judgment of each stakeholder, thereby to promote the connotation construction of quality subjects.

## **2.2 Strengthen Process Evaluation, Consolidate the Function of Evaluation and Diagnosis Improvement**

The quality of education runs through the whole educational activities and it is "a process quantity, not a state quantity". The process quantity is the accumulation of the state quantity, so there is a saying that "the result is the inevitable outcome of the process, and the process determines the result". From the perspective of evaluation development, there is a shift from "results-based" to "both results and processes". In a narrow sense, process evaluation is formative evaluation, that is, in the process of quality generation, diagnostic evaluation and improvement are carried out to guide quality improve toward a predetermined direction and progress. So, as to promote the subject of quality generation to enter zone of proximal development and critical period. During this process, evaluation aims at improvement, and evaluation itself is an approach of diagnosis and improvement, rather than a method of control. Its ultimate goal is to promote the future development of the evaluation object, so that process evaluation is more easily affected by the evaluation object. Accept and support. Its ultimate goal is to promote the future development of the evaluation

object, so that process evaluation can be accepted and supported by the evaluation object more easily. The fourth-generation evaluation theory also focuses on evaluation and improvement functions, which are consistent with the improvement orientation of process evaluation. Therefore, we may learn from the method of the fourth-generation evaluation which takes "preparation, response, negotiation and co-construction" as the behaviour orientation. Particularly speaking, subjective initiative, peer assistance and self-evaluation reflection may worth learning. As for process evaluation strengthening, with the perspective of "Internet+" education, we can strengthen the innovative application of information technology. For example, the development of the "New generation information technology"<sup>4</sup>, technology can provide support for process evaluation such as subject quality status monitoring and development trend prediction, thereby shortening the data collection, analysis and feedback cycle of evaluation, and exerting the diagnostic improvement function of process evaluation.

### **2.3 Explore Value-added Evaluation and Activate the Endogenous Power of the Development of Quality Subjects**

American scholars Taylor and Mike Curran put forward the value-added method of evaluation in the 1980s. "Value-added", as the name implies, means value increasing. The value-added method of evaluation is a method to judge the value based on the evaluation object itself. With different values, the elements and scope of the quality value-added subject are different. From the perspective of schools as the subjects of external evaluation, value-added evaluation only provides a source of information for comparing school effectiveness. It is often used to satisfy the public's need of accountability for university education effectiveness, and it is also used to evaluate school education policies, practices and improvement processes. Austin believes that the quality of a school is determined by whether they help students and how much they help (Zhang,2014). From the perspective of school internal self-evaluation, the purpose of value-added evaluation is to provide teachers with meaningful, effective and accurate basis for progress of students. The commonly used method is to measure the change of students after enrolment or the gap before and after enrolment to judge the quality of students' learning or the room for students to improve. The commonly used way is to measure the change of students after enrolment or the difference before and after enrolment to judge the quality of students' learning and the how much they may improve. For example, colleges in Columbia will test students' general abilities such as quantitative deduction and critical reading at the beginning and end of undergraduate studies to estimate added value. Prof. Ye Lan (2003) pointed out that, what is missing from the current China's pedagogy theory is the conversion of

“abstract person to concrete individual” on the understanding of person. The true value of value-added evaluation is responding to individual growth and development, so it belongs to developmental evaluation. To explore the value-added evaluation from the level of the evaluation subject, it is necessary to study how to use scientific evaluation indicators and tool methods to evaluate how much the value of the quality subject has increased. Therefore, it provides a measurement standard for the subject's quality behaviour and provide an attribution basis for subsequent improvements. To explore value-added evaluation from the level of evaluation object, what need to study is the way to provide institutional support, environment and incentive guarantee for the quality object, stimulating the object's endogenous motivation who may act efficiently and consciously.

#### **2.4 Perfect Comprehensive Evaluation System and Reflect the Essence of Fair and Quality Education**

Comprehensive evaluation, establishing an evaluation index system for multiple stakeholders, is an overall judgment with certain methods or models. The core of this evaluation is making a systematic, comprehensive and complete judgement of the evaluation object. Theory of system emphasizes that we should evaluate the quality from an overall perspective including the system, elements and environment dimensions. For example, in the aforementioned quality audits conducted by institutions in the UK, apart from the interdependence and mutual influence between quality assurance elements, it is also necessary to pay attention to the "conservation of energy" and "information symmetry" between institutions and the external environment. Firstly, from a holistic perspective, the subject of evaluation becomes more diverse, for example, government, industry, and society all collaboratively participate as multi-stakeholders. Secondly, the elements of evaluation are more diverse, since the reform of the "cultural literacy + professional skills" of vocational college entrance examination in recent years might be a great example. Thirdly, there are more types of evaluation objects, especially after the expansion of one million, since the types of students can be various. In summary, it is necessary to meet the utility value needs of multiple subjects, to reflect the multiple evaluation methods and to take the individual needs and overall needs of social development into account.

### **3. Analysis on the Status of External Quality Evaluation in HVCs**

With the convening of the National Vocational Education Working Conference in June 2014 and the release of the *Decision of the State Council to Vigorously Develop Vocational Education*, the management, operation and evaluation become

separated, which means that authorities cannot continue to require vocational colleges to carry out external quality evaluation. Therefore, the main forms of external quality evaluation of HVCs are the data collection of the talent training status, the annual report of the quality led by the education administrative department. Meanwhile, the evaluation of the adaptability led by the education supervision department and the ranking of institutions led by third-party organizations and media are also important parts of external quality evaluation. The following is an analysis of the status of the above-mentioned external quality evaluation methods with the connotation of the "four evaluations".

### **3.1 Data Collection of Talent Educating Status Led by the Administrative Department of Education**

In 2008, the Ministry of Education issued the *Evaluation Plan for Talent Cultivation Work in HVCs*, pointing out that the teaching quality assurance system should regard colleges as the core, education administrative departments as the guidance, while social participation is also part of it. Since 2009, colleges should collect the data of talent training status once a school year and report to the Ministry of Education at a specified time. And the data collection platform for talents education in HVCs has become an important part of the evaluation of the new plan (Zheng,2011). The Department of Vocational Education and Adult Education is the main subject of the quality evaluation, which means the evaluation is a quality evaluation activity implemented at the national level. Data of talent training in HVCs will be analysed with the connotation of the "four evaluations" in the following part. From the perspective of result evaluation, talent development status data systematically evaluates the quantitative quality of input, process, and output of what colleges have done on students and education. And this quantitative quality includes 11 first-level indicators and 54 second-level indicators such as basic information, school conditions, teaching conditions, school funding, teachers, majors, teaching management, teaching researches, social evaluation, student information, and supplementary data, reflecting the performance of colleges. As the fact that status data indicators are updated and improved every year, we may conclude that it increasingly reflects that comprehensive evaluation is systematic, comprehensive and complete. However, in recent years, there is an increase in the adoption of status data in the evaluation of various national and provincial projects, it makes utilitarianism popular among some colleges who focus only on core index. This phenomenon seems to violate the original intention of the evaluation value and goal. From the perspective of the process evaluation, the status data collection work has been done for ten years. Generally speaking, the data collection and status presentation of academic year is conducive to judging the development and construction progress of the college indeed. On the other hand, the data is also limited because of the feature of academic year.<sup>5</sup> So that the process

data provided for the diagnosis and improvement of colleges may be troubled by problems of accuracy and timeliness. So, it is not conducive to the process evaluation at the micro-narrative, while improvement is needed. In terms of exploring value-added evaluation, the status data accumulated over ten years has provided data support for different levels (regions, provinces, institutions, etc.) to understand changes in college development. But value-added changes for students still need further improvement as the platform data collection has not yet landed on the micro individual level. In summary, for HVCs, there is an urgent need to strengthen the integration and application of status data. Colleges may integrate evaluation concepts into daily education and teaching tasks, integrate data business collection into the school information application process, and integrate data's function of production into the teaching diagnosis reform process. From the perspective of education management, it is possible to further enrich, refine and improve outcome evaluation and comprehensive evaluation, further explore the value of status data.<sup>6</sup> Furthermore, continuously updating data collection fields, promoting the sharing and application of data and strengthening data evidence-based, traceability and accountability are also necessary.

### 3.2 Annual Report on the Quality of Higher Vocational Education Led by the Educational Administrative Authorities

In 2010, the *National Medium and Long-term Education Reform and Development Plan (2010-2020)* clearly proposed to "establish the system of annual report of quality in HVCs" (hereinafter referred to as the annual quality report). The annual quality report is the annual report about the quality of talent cultivation (in a broad sense) which is required to reported. It is also an analysis of the quality of inputs (resources and conditions of colleges), process quality (government guidance and college-enterprise cooperation) and result quality (student development and service contribution) from a third-party perspective, giving the society as important approach to understand the development of higher vocational education (2017). The purpose of the Annual Quality Report is to promote self-evaluation by HVCs Though certain framework<sup>7</sup> and data statements<sup>8</sup> are given as criteria for assessment, the evaluation criteria is highly flexible which means it can be expanded by institutions to suit their needs. National Vocational College Quality Annual Report which is compiled by both

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<sup>5</sup> The data is mainly about input and output.

<sup>6</sup> For example, taking majors as categories might be possible.

<sup>7</sup> The framework of 2020 is student development, teaching and learning reform, government responsibility, international cooperation, service contribution and challenges.

<sup>8</sup> In 2020, they are score card, student feedback table, resources table, service contribution table, implementation policy table and international impact table

Shanghai Academy of Educational Sciences and the Mycos Institute has been releasing for more than 8 years. During 2016 to 2019, the National Quality Yearbook selected Top 50 colleges in terms of service contribution, international impact, teaching resources and parenting effectiveness. The "Top 50 Award" has become a "quality label" for institutions to show their reputation and strength. In the context of the "four evaluations", there are still some problems in the implementation of the annual quality reporting system. From the perspective of results evaluation improving, a categorical approach can be considered for the evaluation of the annual report of "Top 50". For example, there are some indicators of size and type, meanwhile, comprehensive and engineering institutions may have significantly better equipment and teaching space per student than art institutions such as finance, economics, politics and law colleges. If the same ruler is used to measure all colleges, it will result in a "one-size-fits-all" situation which will damage the development with characteristics and regional education, and will not be conducive to the education of high-quality, distinctive, and diverse talents. From the perspective of comprehensive evaluation, the current annual report system needs to be further improved in terms of the coverage of quality evaluation criteria and the setting of standard levels. In the context of "double-high" construction, the quality evaluation may take major groups as the unit, extending the content to secondary teaching units and majors. To Analyse from the perspective of value-added evaluation exploring, the annual quality report has new dimensions on students' satisfaction with teaching, management and logistics from 2018, besides the longitudinal data comparison of graduates' employment. And there is no doubt that this change is a reflection of value-added evaluation. However, there are problems such as inconsistent standards of satisfaction evaluation while the credibility of the result data needs to be verified, thus, there is still a need to improve the evaluation standards, changing dimensions and methods. For example, the current trend of international higher education evaluation is focusing more on learner's satisfaction, experience and value-added, then, a nationwide survey on the quality of higher education courses can be considered according to this orientation. Course Learning Experience Survey implemented in Australia for national universities might be a great example (QILT-Quality Indicators for Learning and Teaching, 2020).

### **3.3 Demand- adaptation Capability Evaluation of HVCs led by the Education Supervisory Department**

In 2016, the Office of the Education Supervisory Commission of the State Council issued a notice on the *Interim Measures for Assessing the Capability of HVCs to Adapt Social Needs*. The evaluation of Adaptability to Demand in HVCs is carried out every two years. The indicators, as the criteria of this evaluation, reflect the needs of society, 118 indicators are included, covering five aspects: the basic capability of school running, the construction of "dual-teacher" <sup>9</sup> team, professional talents educating,

student development and social service ability. The assessment data provides strong support for the provincial and national reports, meanwhile, it also provides a factual basis for higher vocational education stakeholders to monitor and assess the ability of HVCs to meet the needs of society. The Interim Measures require HVIs to carry out the evaluation by completing the *Basic Information of HEIs*, *Information on Teachers and Students in HEIs* and *Information on Majors of HEIs*, filling in the *Principal's Questionnaire*, *Teacher's Questionnaire* and *Student's Questionnaire*, meanwhile, this self-evaluation report is required to be published on the school website. Referring to the connotation of the "four evaluations", and to analyse from the perspective of improving outcome evaluation, only self-assessment report of Social Adaptability Evaluation is required to be published, while the summaries of the provincial and national evaluation are not available for the public, meanwhile, institutions do not receive feedback on their submissions, so we may conclude that external diagnostic and advisory functions of this evaluation are absent. Analysing from the perspective of comprehensive evaluation, after the separation of higher vocational management and evaluation, diversification becomes the new trend of HVIs' capability of adaption to needs.<sup>10</sup> However, from the perspective of value-added evaluation exploring, the national annual report has not aggregated, classified and displayed the data provided by each institution. Compared with the national talent training status data of management platform, the value of annual report data needs to be further enhanced by visualising the individual and major indicators of HVCs.

### 3.4 Ranking of Institutions Led by Social Third-party Evaluation Organizations and Media

University ranking is a form of social evaluation, reflecting social supervision of higher education quality and providing the public with a quick and easy way to understand colleges. But they are in no way a substitute for rigorous accreditation of government and relevant organizations. Since the 1980s, university rankings have begun to emerge rapidly around the world. It is considerable valuable to consumers, education policy makers and academic institutions as it is an approach to compare national and international universities. The most influential ranking of HVCs in China are the "Golden Apple" competitiveness ranking of HVCs in China, the Guangzhou Daily Ranking, the Wushulian Ranking and the Chinese Characteristics vocational colleges Ranking. The purpose of university ranking evaluation is to draw public attention to the quality and effectiveness of university education and to satisfy stakeholders' right to know. Meanwhile, the feedback of evaluation can help colleges to

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<sup>9</sup> Teachers who have experience of both industry and school are able to teach theories and practice.

understand themselves more accurately, and support them to realize their shortcomings and identify the ways and directions of development. However, university ranking indicators are sensitive, representative and comparable (Yuan, 2016). The author has compared and analysed the top 10 colleges of the four major rankings with the top 10 of the 2019 “double high” college of A level<sup>11</sup> from the dimension of evaluation results, finding that each list has different evaluation indicators for institutions, leading to different results. At the same time, the rankings are susceptible to factors such as regional cultural, political capitalism and business economics (Zhao, Bai, 2016). Firstly, from the perspective of result evaluation improving, if the evaluation indicators are not sufficiently scientific, comprehensive and representative, the credibility and influence of rankings will be doubted. A wide variety of university rankings will not only interfere with the public's accurate perception of universities, but the rankings will also cause the phenomenon that indicator-oriented system is widely accepted by institutions because of meritocratic-based tendencies. Therefore, the implementers of the evaluation are necessary to carry out meta-evaluation research to justify the rationality and scientific of the indicator system and to ensure the openness of the indicator system and the independence of the evaluation process. At the same time, although the national policies encourage third-party evaluations, it is also necessary to review and certify the qualifications of third-party evaluation organisations. For example, third-party evaluation organisations can be commissioned by the Ministry of Education. We can believe the supervision and management may ensure the objectivity, impartiality and fairness of university ranking evaluation. From the perspective of comprehensive evaluation, it is found that university rankings are shifting from the original single evaluation to a deep and multi-dimensional evaluation. For example, the dimensions change from comprehensive competitiveness of colleges to major categories, professional categories and specialties, from comprehensive strength to basic development capability, faculty competitiveness, talent education ability, social service and reputation, and from evaluation of individual college to regional. The development of the above stratified, categorised and regional university ranking evaluations has responded to the pluralistic fact of comprehensive evaluation. However, there is a great need for full authority and impartiality in terms of evaluation methods, especially in terms of weighting design and expert scoring.

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<sup>10</sup> Subjective survey data of each quality subject of the institution , self-evaluation reports of institutions basic data of majors.

<sup>11</sup> “Double High” colleges are divided into A level, B level and C level.

## 4. Countermeasures and Suggestions for Reform Based on the "Four Evaluations"

External evaluation has a guiding effect on internal evaluation. Higher education institutions, as the subject, need to adopt a combination of internal and external evaluation to improve overall quality of education. Therefore, external system guarantees, organizational guarantees, technical guarantees, and team guarantees will greatly affect the implementation of the evaluation. According to the connotation of the "four evaluations" and the current situation of external quality evaluation of HVCs, the following four reform measures and suggestions are put forward.

### 4.1 Improving the Institutional Design of Quality Evaluation in Higher Education Institutions from the Dimension of Law Ruling

The rule of law is precisely one of the connotative manifestations of governance. Throughout the world's higher education system, the requirements for quality evaluation and assurance of colleges are clearly defined in the laws and regulations. In Japan, the *School Education Law* stipulates that, all Japanese HVCs must undergo a comprehensive evaluation on school education, research, management, school buildings and equipment within seven years in order to improve education and research standard (Gu,2018). In Russia, *the Law on Education* stipulates that since 2013, all HVCs must participate in the annual evaluation of the effectiveness which is organised by the country, while the results of the evaluation are used as the basis to judge whether the institutions can be kept (Wang, 2018). Therefore, only sound legal documents, policy texts and regulatory procedures can ensure that the act of evaluation is based on law and rules, so that the results can be more recognized by universities and the government as a reference basis for decision making on educational development and reform. Specific provisions on the evaluation of the quality of higher education cannot be found in China's *Education Law*, *Higher Education Law* and *Vocational Education Law*, except for Article 44 of the *Higher Education Law of the People's Republic of China*, which states that HVCs shall establish a system for evaluating the standard and quality of education by their own institutions, and relevant information should be published in time to accept social supervision. The administrative department of education shall be responsible for organizing experts or third-party institutions to evaluate the standard, effectiveness and quality of education. The evaluation results shall be available for the society." At present, the system design of evaluation adopted by Chinese undergraduate education has played a role of "external factors driving internal factors" and has promoted the improvement of the internal quality assurance system of undergraduate colleges. In contrast, the operational effectiveness of the teaching diagnosis reform system which is designed under the background of separation of management, operation and evaluation still needs to be tested in practice and "escorted" by administrative forces.

In summary, the education authorities need to improve the system design of the quality evaluation and guarantee of higher vocational colleges from the legal level as soon as possible to improve the supervision mechanism of third-party institutions, so that the implementation of the "four evaluations" may be guaranteed.

#### **4.2 Clarify the Subject of Responsibility for the Quality Evaluation of Higher Vocational Colleges from the Management Dimension**

The sustainable operation of quality evaluation in higher education requires the support of sound and efficient organisation (Ma, 2014). In the context of the separation of management and evaluation in HVCs, the management of external quality evaluation has restructured organisational system from the Ministry of Education to the institutions. However, the division of work among the organisations at all levels is unclear, as what can be found through the five-year-operation of the teaching and diagnosis system. The Department of Vocational Education and Adult Education, the National Supervisory Committee and social third-party evaluation organisations are subjects of the external quality evaluation as described above. While assessment and evaluation activities of the undergraduate universities are basically led by the Assessment Centre of the Ministry of Education, the evaluation of vocational education suffers from problems like multiple management and blurred responsibilities. To solve this problem, we can study and learn from the practices of developed countries in higher education but based on Chinese national conditions and the realistic need to promote the modernization and construction of educational governance. For example, France establishes the Council of Quality in Higher Education, the UK and Australia set the Higher Education Quality Assurance Agency, while the University Reform-Support and Degree Awarding Agency is found in Japan (Ma,2014).

#### **4.3 Strengthen Standards for Quality Assessment of Higher Education Institutions from a Technical Perspective**

A sound quality standard system is a prerequisite for ensuring the construction of a quality evaluation system for higher education. *The Opinions on Implementing the Construction Plan of High-level Vocational colleges and Specialisations with Chinese Characteristics* clearly proposes that policies, systems and standards should be focused on to support the high-quality development of vocational education. This cannot be achieved without quality construction and evaluation standards. Vocational education in developed countries have built relatively sound systems of vocational skills standard, such as the Vocational Skills Standards System in the United States, the New Framework for Employment Skills in Australia and the Skills Framework of Singapore (Zhang, Yuan, 2018). The only way to ensure the sustainability of quality

development is to strengthen the scientific feature of the evaluation standard system since the "four evaluations" of *Overall Plan* cannot live without standard construction. Therefore, we should continue to establish macro standards at the national level, pay attention to the integration with national strategies and social development needs, and formulate quality evaluation standards for higher vocational education. In addition, focusing on the research, setting and implementation of the standards in terms of stratification, classification and region is also important to ensure the evaluation is scientific but not outdated, so that the characteristic and high-quality development can be promoted.

#### **4.4 Promote the Professionalization of Quality Evaluators in Higher Education Institutions from the perspective of Team Members**

The professionalisation of evaluators is an important step in improving the quality of evaluation. The effectiveness of education evaluation depends on the professional characters and career literacy of the evaluation subject to large extent. Whether we have a professional and high-quality evaluation team may directly related to the level of quality governance of higher vocational education in China. At present, there is a tendency of homogeneity and bureaucracy in the sources of education quality evaluation subjects. To compare with the implementation subjects of accreditation and auditing of oversea institutions, we may find the evaluation subjects have such distinctive features as diversified sources, professional competence and qualification accreditation (Guo, 2015). Therefore, in order to promote the "four evaluations", firstly, the education authorities should promote the construction of Evaluation Think Tank for vocational education as soon as possible. The members may include master craftsmen in various professional fields, experts of vocational education, evaluation professionals, representatives of industry enterprises and representatives of educational administrative departments, etc. Secondly, the education authorities need to further focus on the accreditation of evaluation qualifications to lead their professional behaviours. The government also need to establish and implement policies gradually to qualify evaluators, thereby enhancing the professionalism of China's education evaluation team (Guo,2015).

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# **Technical and Vocational Education and Training (TVET) Students' Perceptions on a Digital Mind Map to Stimulate Learning of Technical Skills in Malaysia**

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## **Abstract**

Digital mind maps are digital visuals that are becoming increasingly popular in today's technology era. Recently, many people are using it to create outline, improve understanding, take notes during meetings and plan projects using a simple mind map. Today, in teaching and learning, digital tools are preferable by teachers and students rather than the traditional tools. Hence, this case study aims to investigate the practice of digital mind map among Technical and Vocational Education and Training (TVET) students. A sample of 372 students were randomly selected from several public higher institutions in Malaysia. The online questionnaires were designed to measure the practice of digital mind map among TVET students. The data were collected and analysed using the SPSS version 26. The empirical results showed that the TVET students had a positive perception toward the digital mind map. Thus, the digital mind map has a potential to stimulate learning of technical skills among TVET students in Malaysia.

**Keywords:** TVET students, digital mind map, perceptions, learning of technical skills

## Introduction

Technical and Vocational Education and Training (TVET) is an education and training field that encompasses formal and non-formal skills, and informal learning that prepares young people for future jobs (Mustapha, 2017). In Malaysia, TVET programmes are offered at certificate, diploma, and degree levels in more than 1,000 TVET institutions such as polytechnics, community colleges, and vocational colleges. Recently, TVET in Malaysia is recognized as one of the strategies in achieving Shared Prosperity Vision 2030. This vision emphasises the quality of life by focusing on the well-being of the people and the forging the unity of the people from various backgrounds. In terms of technology, better quality of life could be achieved by using proper and safe technologies. Furthermore, the TVET students should be trained to be technological literate in line with the Fourth Industrial Revolution (I.R 4.0) requirements – which is primarily engaged with the use of digital technologies, Artificial Intelligence and big data (Karim et al., 2020). Based on the 21<sup>st</sup> century paradigm, TVET students today are required to possess top five technical skills:

(a) critical thinking and problem solving, (b) teamwork and collaboration, (c) professionalism and strong work ethics, (d) oral and written communications skills, and (e) effective leadership. Regarding the learning tools that the TVET students need to grasp, the mind map is one the techniques that covers more brain potential for the users (Karim et al., 2020). Buzan (2009) describes the mind mapping as a technique of storing, editing and organising information generally on paper, by means of using key words and key images. Today, the mind map is more advanced by using digital tools due to the advancement of technology. An empirical study by Karim and Mustapha (2020) found that students in the higher institutions believed that the digital mind map inspired them to be creative in producing ideas and encouraging their critical thinking. However, there are few studies that focuses on digital mind mapping from the perspective of the technical and vocational students. Therefore, it is critical to examine the TVET students' perceptions on the digital mind map to stimulate learning of technical skills in Malaysia.

## Purpose and Objectives of the Study

The purpose of the present study was to investigate the TVET students' perceptions on the digital mind map to stimulate learning of technical skills in Malaysia. Specifically, the objectives were as follows:

- To identify the TVET students' perceptions on the digital mind map
- To identify the TVET students' perceptions on the digital mind map to stimulate learning of technical skills
- To examine the relationship between the TVET students' perceptions on the digital

mind map and learning of technical skills

## The Conceptual Framework

The conceptual framework of the study in Figure 1 showed the three main variables of the study. The digital mind map was set as the independent variable based on Lin and Faste model (2012) which consisted of three sub-constructs: (a) speed and efficiency, (b) appearance and mechanics and (c) ontology and concept mapping. The TVET students' learning of technical skills was designed as the dependent variable. The sub-constructs of the dependent variable comprised of knowledge in use, student-centered learning and learning by discovery were used for this model. Finally, the moderator variable was comprised of two demographics of the respondents which were gender and age. The conceptual framework was suggested that the digital mind map was anticipated to stimulate learning of technical skills among TVET students.

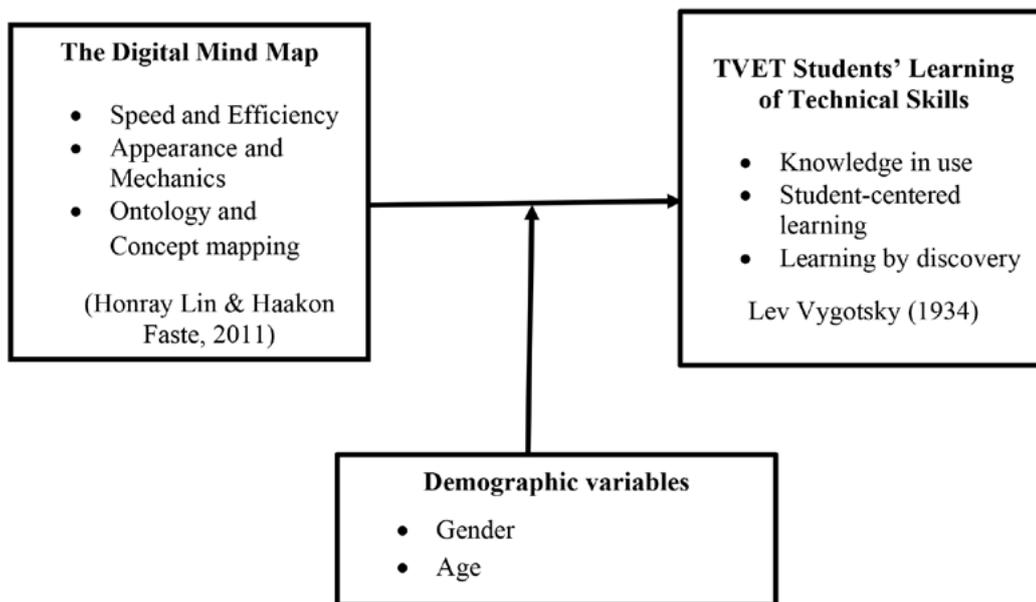


Figure 1: Conceptual Framework for Learning of Technical Skills among TVET Students

## Methodology

This study employed a case study design to investigate the TVET students' perceptions on the digital mind map to stimulate learning technical skills in Malaysia. An online questionnaire was designed based on the two models: Lin & Faste (2012) and Vygotsky (1987). For the first model, it included speed and efficiency, appearance and mechanics, and ontology and concept mapping to measure the perceptions on

the digital mind map among TVET students. The second model consisted of three elements: knowledge in use, student-centered learning and learning by discovery. The questionnaire items for this model were created to measure the TVET students' perceptions on the digital mind map to stimulate learning of technical skills. The online questionnaire comprised of five parts: (A) Student profile (6 items), (B) The TVET students' perceptions on the digital mind map (18 items) and (C) TVET students' perceptions on the digital mind map to stimulate learning of technical skills (18 items), and (D) three open-ended items. The students were asked to respond to a total of 45 items of the questionnaire. The respondents were also asked to answer three parts of open-ended items (Item A, Item B and Item C) in the part D of the questionnaire. First, the open-ended items asked about the main reasons that the TVET students use digital mind mapping for the technical studies. Then, they were also asked to answer three factors that enhance learning of technical skills when using digital mind mapping. Finally, they also need to answer what other factors besides the practice of digital mind map that will enhance learning of technical skills. All the items for Section B and Section C were measured by using 5-point Likert scale: strongly agree (5), agree (4), uncertain (3), disagree (2) and strongly disagree (1). The reliability of the instrument was established by using Cronbach Alpha coefficient,

$\alpha = 0.98$ .

## Results and Discussion

### Profile of the Respondents

From Table 1, it showed the characteristics of the respondents of the study. The total of the respondents for the study is 372. There are 162 male (43.5%) and 210 female (56.5%) students who responded the questionnaire. Majority of the respondents (60.2%) are in the age group of 17-19 years followed by the age group of 20-22 years which is 31.5% respondents. Next, the respondents come from the age group of 23 -25 years which is 6.7% respondents. The lowest percentage of the respondents (1.6%) is the age group of 25 years and above. Based on the location of hometown, majority of the respondents (69.1%) live in the city whereas 18.3% stay in rural area. Only 12.6% of the respondents stay in suburban vicinity. From the table, it displays that almost all respondents (96.8%) said they enjoyed learning technical and vocational course in their institution. Only 3.2% of the respondents did not enjoy the technical and vocational courses. Regarding the familiarity of the digital mind map, majority of the respondents (88.7%) said they know about the digital mind map whereas only 11.0% of respondents did not know the tool. The respondents (70.4%) mostly answered that they had experienced of using the digital mind map. Only 29.3% respondents said they never use the digital mind map before.

Table 1: Characteristics of the Respondents (n=372)

Characteristics	Frequency	%
<b>Gender</b>		
Male	162	43.5
Female	210	56.5
<b>Age (years)</b>		
17-19 years	224	60.2
20-22 years	117	31.5
23 -25 years	25	6.7
25 years and above	6	1.6
<b>Location of Hometown</b>		
City	257	69.1
Rural	68	18.3
Suburban	47	12.6
<b>Do you enjoy learning technical and vocational courses in your institution?</b>		
Yes	360	96.8
No	12	3.2
<b>Do you know what a digital mind map is?</b>		
Yes	330	88.7
No	41	11.0
<b>Have you ever used a digital mind map?</b>		
Yes	262	70.4
No	109	29.3

To fulfill the research objectives of the study, the response presented in Table 2 and Table 3 illustrated the perceptions on the digital mind map and how it stimulates learning of technical skills among the TVET students at higher learning institutions. The interpretation for the mean values in this study was divided into five parts: Strongly Agree (4.21-5.00), Agree (3.41- 4.20), Uncertain, (2.61-3.40), Disagree (1.81-2.60) and Strongly Disagree (1.00-1.80). Based on the findings, we described the three highest means and the three lowest means of the items.

### **TVET Students' Perceptions on the Digital Mind Map**

Table 2 demonstrated the items perceived by the TVET students about the digital mind map. Among the highest means involved that the respondents mostly strongly agreed (M = 4.26; SD = 0.75) that using colours, nodes and links while creating the digital mind maps make their learning process easier in item 10. Furthermore, the respondents also mostly agreed in item 5 (M=4.15, S.D=0.80) that the digital mind map enabled them to drag ideas, enlarge lines and use pictures easily. Finally, the findings also showed that the respondents also agreed (M=4.14, S.D=0.82) that the digital mind map can save time because it allowed the students to work faster (item 6).

Table 2: TVET Students' Perceptions on the Digital Mind Map

Item	Construct	M	SD	Interpretation
	<b>Speed and Efficiency</b>			
1	I create ideas faster when I use the digital mind map	3.93	0.79	Agree
2	I store my ideas effectively when I use the digital mind map	4.01	0.79	Agree
3	I believe that using the digital mind map is faster than using pen and paper to create mind maps	3.91	0.98	Agree
4	I think that the digital mind map can give more space than using pen and paper to create mind maps	4.03	0.89	Agree
5	I think that the digital mind map enables me to drag ideas, enlarge lines and use pictures easily	4.15	0.80	Agree
6	Using the digital mind map can save time a lot because the software allowed us to work faster	4.14	0.82	Agree
	<b>Appearance and Mechanics</b>			
7	I design the digital mind map contents very well	3.73	0.87	Agree
8	I insert text input easily using the digital mind map	4.02	0.80	Agree
9	I save and retrieve stored information easily using the digital mind map	3.98	0.80	Agree
10	I believe that using colours, nodes and links while creating the digital mind maps make learning process at ease	4.26	0.75	Strongly agree
11	I believe that dragging one node into another could easily create a link between them when using the digital mind map	4.00	0.79	Agree
12	I believe that the navigation and layout mechanics of digital mind maps represent a prospective digital tool	4.01	0.79	Agree
	<b>Ontology and Concept Mapping</b>			
13	I organize my ideas in a structural way through the digital mind map	4.00	0.80	Agree
14	Digital mind mapping can enhance my understanding of concepts and ideas	4.09	0.81	Agree
15	I understand the relationships across ideas within the digital mind map	4.01	0.80	Agree
16	I generate ideas using the digital mind map effectively	3.91	0.82	Agree
17	I believe that the digital mind maps can help me to organize my ideas	4.05	0.83	Agree
18	I believe that the digital mind is a great tool to link and organize ideas	4.08	0.78	Agree
	Total average	3.93	0.79	Agree

Based on the lowest mean from the findings, the respondents were barely agreed (M=3.73, SD=0.87) that they designed the digital mind map contents very well (item 7). The respondents also were not so agreeing (M= 3.91, S.D =0.98) with item 3 which

stated that they believe the use of the digital mind map is faster than using pen and paper to create mind maps. Another lowest mean was for item 16, the respondents were slightly agreed (M= 3.91, SD =0.82) that they create ideas using the digital mind map in effective ways.

### **TVET Students' Perceptions on the Digital Mind Map to Stimulate Learning of Technical Skills**

The results of the TVET students perceived on the digital mind map to stimulate learning of technical skills were illustrated in Table 3. The highest mean to stimulate learning of technical skills was that the TVET students believed (M= 4.13, S.D =0.78) that their previous knowledge is essential for technical learning in item 19. The second highest mean revealed that the TVET students agreed (M= 4.10, S.D =0.83) that the digital mind map can be used in various creative ways, and it can enhance their learning of technical skills (item 24). Lastly, the students also agreed (M= 4.06, S.D =0.80) that the digital mind map can encourage to think creativity and critically in completing the technical tasks.

Table 3: TVET Students' Perceptions on the Digital Mind Map to Stimulate Learning of Technical Skills

Item	Construct	M	SD	Interpretation
	<b>Knowledge in Use</b>			
19	I believe my previous knowledge is important for technical learning.	4.13	0.78	Agree
20	I believe the digital map can develop my learning of technical skills .	4.08	0.77	Agree
21	I believe my previous knowledge can create new knowledge in technical learning through digital mind map practice.	4.05	0.79	Agree
22	I develop my new ideas on technical learning using the digital mind map.	3.98	0.83	Agree
23	I believe that the digital mind map can help me in designing new ideas in my technical studies.	4.07	0.81	Agree
24	I believe that using the digital mind map in various creative ways can enhance my learning of technical skills.	4.10	0.83	Agree
	<b>Student-centered Learning</b>			
25	I can think new ideas individually in technical tasks using the digital mind map	3.99	0.78	Agree
26	I can construct ideas and knowledge myself using the digital mind map	4.00	0.79	Agree
27	I feel determined to produce more creative technical ideas using the digital mind map	3.96	0.84	Agree
28	I can create ideas individually using the digital mind map	3.99	0.82	Agree

29	I believe that the digital mind can develop my critical thinking for my technical studies	3.97	0.81	Agree
30	I believe that I can discover and transform complex information individually using the digital mind map	3.94	0.83	Agree
<b>Learning by Discovery</b>				
31	I can create original ideas through the digital mind map with the help of my technical instructor	4.00	0.79	Agree
32	I think the digital mind map can facilitate my technical learning	4.05	0.76	Agree
33	I believe that the digital mind map is an effective inquiry-based learning technique for technical students	4.03	0.77	Agree
34	I believe that the digital mind map is an effective practical application for enhancing technical knowledge and skills	4.06	0.77	Agree
35	I believe that the digital mind map can encourage me to think creativity and critically in completing my technical tasks	4.06	0.80	Agree
36	I think that the digital mind map can help me to solve my problems in my technical studies	4.02	0.80	Agree
Total average		4.13	0.78	Agree

Regarding to the lowest mean, the data in item 30 showed that the TVET students barely agreed ( $M= 3.94$ ,  $S.D =0.83$ ) that they can discover and transform complex information individually using the digital mind map. It is followed by the second lowest mean in item 27, the respondents were barely considered ( $M= 3.96$ ,  $S.D =0.84$ ) that they feel determined to produce more creative technical ideas using the digital mind map. The third lowest mean showed that the respondents were slightly agreed ( $M= 3.97$ ,  $S.D =0.81$ ) that the digital mind can develop the critical thinking for the technical studies.

With regards to examine the relationship between the TVET students' perceptions on the digital mind map and learning of technical skills, Table 4 and Table 5 illustrated the findings of the research objectives. The overall mean for digital mind map was ( $M= 4.03$ ) and the overall mean for TVET students' learning of technical skills ( $M=4.02$ ) for both constructs: (i) digital mind map and (iii) TVET students' learning of technical skills. The results showed that the TVET students perceived highly positive on the digital mind map ( $M =4.02$ ;  $SD = 0.64$ ) and learning of technical skills for TVET students ( $M=4.03$ ,  $S.D 0.66$ ).

Table 4. Overall Mean and Standard Deviation for Constructs

Constructs	Mean	Standard Deviation
Digital Mind Map	4.02	0.64
TVET Students' Learning of Technical Skills	4.03	0.66

Based on Table 5, it showed there was a significant high positive correlation ( $r= 0.91$ ;  $p<0.05$ ) between the digital mind map and TVET students' learning of technical skills.

Table 5. Relationship between the TVET Students' Perceptions on the Digital Mind Map and Learning of Technical skills

Variable	Digital Mind Map	
	r	p-value
Technical skills for TVET students	0.91	0.000

### Open-ended Items Analysis

The final part of the questionnaire that the TVET students need to answer was the open-ended items. They asked to answer three open-ended items. The qualitative data gathered in this section were analysed using thematic analysis as in Table 6. The Item A asked the TVET students to list three main reasons to use digital mind map in the technical studies. The three themes emerged were easy tool, save time and increase creativity for Item A. The highest rank for easy tool theme was rated by the TVET students in this item. Next, the TVET students rated save time as the reason for they use the digital mind map in their studies. They also answered that the digital mind map may increase creativity in the technical studies as the third highest frequency for the theme emerged. For Item B, the highest rank for three factors that enhance learning of technical skills when using digital mind mapping was creativity and design ideas as the most rated by the students. Then, it was followed by the second factor which was development of ideas as the theme emerged from the item B. The next factor that the students ranked as the third highest was better understanding.

Table 6. The Open-ended Items Analysis

Open-ended Items	Rank	Main Themes	Frequency (f)
A. List 3 main reasons to use digital mind maps in technical studies	1	Easy tool	235
	2	Save time	80
	3	Increase creativity	57
B. List 3 factors that enhance learning of technical skills when using digital mind mapping	1	Creativity and design ideas	82
	2	Development of ideas	66
	3	Better understanding	43
C. List 3 factors besides the digital mind maps that will enhance learning of technical skills.	1	Training and practices	97
	2	Learn other skills	43
	3	Digital technology application	31

Finally, the last item was about the three factors besides the digital mind maps that will enhance learning of technical skills. The respondents ranked training and practices as the first main factor followed by the factor of learn other skills for enhancing learning of technical skills. Another most rated factor was the digital technology application that TVET students agreed that it can enhance learning of technical skills.

## Conclusion

The purpose of this study was to identify TVET students' perception on the digital mind map to stimulate learning of technical skills. The empirical results showed that respondents had a positive perception toward the digital mind map. The tool has a potential to stimulate learning of technical skills among TVET students. Furthermore, the results also confirmed there was a strong positive and significant relationships between the digital mind map and learning of technical skills for TVET students. However, there are areas that need to be studied further in future. Based on these results, the educators could obtain understandings on how to improve TVET students' learning of technical skills. In brief, the empirical data in this study could be used to develop a new framework of pedagogy in TVET field.

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Technical and Vocational Education and Training (TVET) Students' Perceptions on a Digital Mind Map to Stimulate Learning of Technical Skills in Malaysia

**BACK**

# **Online Learning Approach during the Attack of COVID-19 at Vocational Higher Education in Indonesia: Its Implementation and Impact**

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## **Abstract**

*COVID-19 pandemic affected the education system in most countries in the world. As one of the Southeast Asia countries, Indonesia also experienced a slump in the education sector. Governments, educators, students, and even parents have to make an effort to facilitate and support for nonstop teaching and learning process. This study was conducted to describe the educational system implemented and its impact on Indonesian vocational higher education during the attack of the COVID-19 pandemic. A literature study in a documentary study as part of qualitative research has been compiled this research. Online learning has become an excellent choice as a learning model performed by the government to keep the teaching and learning process without attending schools since the pandemic. Indonesian vocational higher education such as Polytechnic must encounter an uncommon massive transition from conventional learning to online education. The learning system in Polytechnic contains 60% hands-on practice and 40% theoretical, encouraging educators to consider the right platform to utilize in online learning. Students should get more direct practice and mastery specific applied skills than theoretical knowledge. As a result, Google classroom and YouTube videos were selected as online learning platforms in vocational higher education. Google Classroom was chosen because it complies with the International Society for Technology in Education (ISTE) standards. It is simple to use, has a reasonable number of features, can be used for no cost, and could improve communication between students and educators. While YouTube video is the most common practical learning educators employ in vocational higher education. YouTube video adds a new dimension to learning vocational skills and effectively assists the learning process of occupational practice skills. Since online learning was first employed in vocational higher education, it is essential to explore both the educators' and the students' perspectives about its impact. Educators and students can minimize*

*the disadvantages of online learning to face a new age of education, particularly since the pandemic.*

**Keywords:** Attack of COVID-19 pandemic, Online learning, Indonesian Vocational Higher Education.

## I. Introduction

The 21<sup>st</sup> century is marked by the attack of Coronavirus disease (COVID-19). It has impacted the education system in most countries in the world. Each country took various actions to maintain the learning process' sustainability to avoid students' discontinuation in learning activities. They have to choose a teaching and learning approach without attending schools or universities, but it must keep going (Han et al., 2021).

Indonesia is one of the Southeast Asia countries facing the attack of the COVID-19 pandemic too. There is no choice for all schools, universities, and vocational higher educations to carry out an online education approach. Online learning becomes an excellent choice to defend the teaching and learning process during the pandemic. Teaching and learning experience a significant shift from conventional learning to online education (Bao, 2020).

The online learning approach keeps students studying at home in healthy and safe surroundings. It gives students a chance to attend the courses regardless of time and distance (Maulana, 2021). Moreover, it provides knowledge transfer experience for students through video, audio, graphics, and text communication using internet connections (Basilaia & Kvavadze, 2020; Zhu & Liu, 2020).

The Indonesian government has made regulations to prevent the transmission of the COVID-19 pandemic in the education system. Through the Circular of the Minister of Education and Culture (MOEC) No: 36962/MPK.A/HK/2020, the government performs a policy of implementing an Online Learning and Working from Home (WFH) (Arsana & Ariyanto, 2020; Azzahra, 2020; Fahrizal<sup>1</sup> et al., 2020).

Indonesian vocational higher education such as Polytechnic must encounter an uncommon massive transition from face-to-face classrooms to online learning. It is big defiance since its learning system contains 60% hands-on practice and 40% theoretical. Students should get more practice in the workshop and mastery specific applied skills than theoretical knowledge. It encourages educators to consider the right platform for the teaching and learning process, prioritizing practices for students' competency and skills during the pandemic (Erliana et al., 2021; Fahrizal<sup>1</sup> et al., 2020).

The online learning approach becomes a challenge and opportunity in vocational higher education. It is an opportunity because educators and students can improve their ability to employ and access technology (Murad et al., 2020) . Educators become professional in adjusting to technological changes, renouncing teaching habits, and improving digital learning competence. In contrast, students are encouraged to expand their information learning capacity, practical ability, innovative spirit, and lifetime learning ability (Han et al., 2021).

While, a challenge because online learning brings a new age of education (Spender, 2001). The preparedness of educators, students, and institutions is needed to face the new era in the education system. Online learning presents some obstacles, such as providing digital technological equipment (*e-learning*), experience with online instruction, and financial resources (Hanson, 2004). Besides, it can burden students, especially those with low economic resources. They are unable to provide suitable devices for accessing online learning tools. Internet quotas also appear to be an issue (Bao, 2020; Maulana, 2021).

In the unexpected transition, constant learning must occur, even though there have been some barriers to online learning. It has been successfully applied for more than a year in Indonesia at all levels of educations, including vocational higher educations. Moreover, various studies have been done on Indonesian vocational higher education's advantages, disadvantages, implementation, and impact.

This study was to view an online learning approach during the attack of the COVID-19 at Indonesian vocational higher education, focusing on two research questions as follow:

1. What is the implementation of online learning in Indonesian vocational higher education during the attack of the COVID-19 pandemic?
2. What is the impact of online learning in Indonesian vocational higher education during the attack of the COVID-19 pandemic?

## **II. Literature Review**

Online learning has become a trend in the teaching and learning process in the 21<sup>st</sup> century. In addition, online learning enables educators and students to share knowledge by utilizing technology. To define online learning, a variety of concepts have emerged from various sorts of studies.

## Online Learning

Online learning refers to the distribution of content in real-time over the internet, with students engaging in classes anywhere (Ferreira et al., 2018; Martin & Betrus, 2019). According to (Spender, 2001), online learning is a new style of education. It is a recent form of education that allows students more control over their learning process. Then, self-directed education through teacher-student interaction is presented through online learning. The teaching-learning process is enhanced by information and communication technology (ICT) (Hofmeister & Pilz, 2020).

According to (Hartnett, 2016), online learning is "distance education mediated by technical instruments where learners are geographically distant from the instructor and the leading institutions." Moreover, online learning is the experience of knowledge transmission using video, audio, images, text communication, software, and the internet network as the medium (Bao, 2020; Zhu & Liu, 2020).

In sum, online learning is described as a different approach to learning among educators and students in various locations, in which the internet and technological devices play an essential role.

## Some Form of Online Learning

People frequently mix up terms like e-learning, web-based learning, computer-based training, computer-based instruction, and technology-based instruction. Although each is a particular form of online learning with its definition, several terms can be used synonymously (Carliner, 2004).

E-learning, for example, is a distance education in which technology assists the learning process and teaching is delivered through the internet. Students and educators do not need to be at the same time and in the same places.

While computer-based training refers to courses provided by the computer, technology-based instruction refers to learning through any medium other than the classroom. Computers, television, audiotape, videotape, and print are all included (Carliner, 2004; Siemens et al., 2015).

## Online Learning in Education

Education is a system for obtaining long-term knowledge and skills. When learning takes place in a classroom, an instructor is called a teacher. While learning is held online, technology device acts as an educator. The machine replaces the role of a teacher. The internet provides two forms of education:

### **a. The Virtual Classroom**

It appears to be a classroom where students and educators are geographically separated, but they teach and learn simultaneously. In addition, they engage one another on the internet. As a result, both educators and students can impact the quality of interaction (Carliner, 2004). Due to educators and students being both online at the same time, this instruction is called synchronous. Briefly, synchronous learning is a type of learning in which students and educators engage directly while using online services.

### **b. The Online Course**

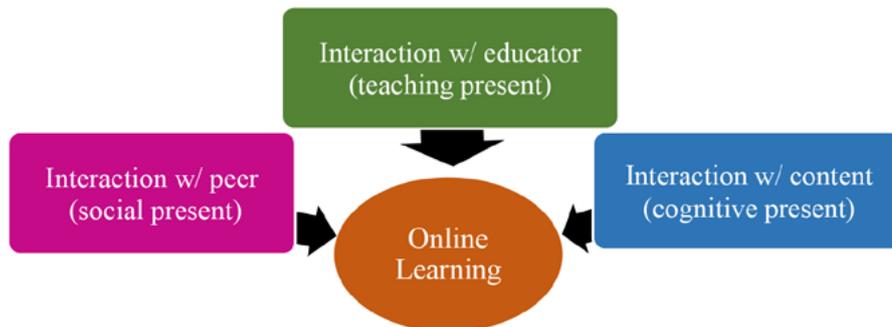
It is a computer-based structured learning experience in which educators and students are separated by time and geography. Courses, such as problem-solving and simulation-based learning, are employed to organize learning materials. To learn the courses, students engage directly with computers. This strategy is known as asynchronous since educators and students do not have to be online simultaneously (Carliner, 2004).

## **III. Methodology**

Online learning has become a familiar term for educators and students at all levels of the Indonesian education system during the attack of the COVID-19 pandemic. This paper was conducted to describe online learning implementation and the impact on vocational higher education. This research was compiled by conducting a literature study in a documentary study as part of qualitative research (Moleong, 2021).

In collecting and analyzing data, the researcher obtained primary sources from the government regulations, national and international journals. The journal articles were taken from Google Scholar, Web of Science, and written in Indonesian and English. The 58 studies were the total number of literature sources. Furthermore, 31 were selected by sorting and classifying suitable to the central topic of this paper. Then, the chosen studies were retained if containing information about the recent phenomenon of this study's interest.

The study framework showing the grounded in established the papers' idea. Online learning switches educators' roles to technology devices. The conceptual picture below



The concept of online learning is defined as learning using technology. It refers to events at least two persons or things that influence each other in some way (Wagner, 1994). Interaction with content, instructors, and peers is the three types of interactivities identified by researchers that affect online learning.

Interaction with content emphasizes learners with the course materials. Interaction with educators involves teaching, guiding, correcting, and encouraging students. Then, interaction among peers refers to exchanges among learners, including debate, engagement, discussion, informal and incidental learning (Swan, 2003).

Briefly, this concept indicates the uniqueness of online learning when interacting with content refers to knowledge and skill studied. Interaction with educators refers to the online education environment. Then, interaction with students relates to teaching and learning in social nature.

#### IV. Discussion

This part views the online learning approach during the attack of the COVID-19 pandemic in Indonesia that changed the education system. It points out the implementation of online learning and its impact on Indonesian vocational higher education during the attack of the COVID-19 pandemic.

#### I. Implementation of Online Learning during the Attack of the COVID-19 Pandemic in Indonesian Vocational Higher Education.

##### Online Learning in Indonesia

The Indonesian government has an effort to facilitate and support nonstop teaching and learning processes while at home. Through MOEC, the government has created various sites and services that students and educators can access to continue online education (Azzahra, 2020). One of the renowned websites provided for online learning applications is known as "Rumah Belajar." It can access through the link <https://belajar.kemdikbud.go.id>. This portal has many excellent features and is

accessible to students and educators at all levels of education (Abidah, A, 2020).

Moreover, several platforms such as Smart Classes, *Ruangguru*, Quipper, Google, *Sekolahmu*, Zenius, and Microsoft are employed in online learning. Each platform contains free and open-to-the-public services so students and educators can utilize them to expand learning resources (Azzahra, 2020).

Smart Class allows students to learn online from anywhere. As well as Smart Class, *Sekolahmu* offers home learning for pre-school and high school students (Kasih, 2020). In contrast, the Zenius platform assisted students in preparing for the National Examination (UN) and Computer-Based Written Examination (UTBK).

Quipper provides teachers, and students videos, modules, and a collection of questions of the National Examination (UN) and Computer-Based Written Examination (UTBK) for junior and senior high schools across Indonesia (Abidah, A, 2020). Google Classroom is one of the platforms primarily used in Indonesian higher education. In addition, PT. Microsoft Indonesia offers Office 365 access for educational purposes (Azzahra, 2020).

### **Online Learning in Indonesian Vocational Higher Education**

The COVID-19 pandemic changes the teaching and learning system in Indonesian vocational higher education. Online learning replaces conventional teaching. Educators should employ technology to promote teaching quality effectively. They must reorganize a learning material to integrate practice training and internship by adapting technology support. Besides, they have to optimize skills that used to be taught with practices in the workshop or fields through online education (Amin et al., 2020).

Since the learning system in vocational higher education such as Polytechnic applies 60% hands-on practice and 40% theoretical (Erliana et al., 2021), students should get more direct practice in the workshop, field training, and internship than theoretical knowledge. In addition, they must possess specific applied skills, so the preparedness with the knowledge, skills, and attitude make them ready to get into the workplace (Amin et al., 2020).

As a result, educators in vocational higher education have to set up and modify technology for their teaching method, plans, and instructional strategies to boost students' attention and engagement to obtain learning material in online learning (Bao, 2020; Han et al., 2021). In addition, educators should notice instructional strategies to make learning materials more attractive, exciting, valuable, and easier to achieve and understand for students during online learning (Bao, 2020; Han et al., 2021).

platform, including selecting a platform that can be utilized for online learning and creating a learning environment that motivates students to learn, such as making tutorials. Then, prepare learning resources in the *e-book*, video, or other media for the practical course, and get students' attention by splitting the teaching material into smaller sections (module in 20-25 minutes) (Bao, 2020; Suswanto et al., 2021).

The instructional strategies become a guide for educators in vocational higher education to determine excellent online learning (Aliyyah et al., 2020). In addition, Google Classroom and YouTube videos have been chosen as online learning platforms in the teaching-learning process on vocational higher education since the COVID-19 pandemic (Azzahra, 2020; Kholifah et al., 2020; Wan Hassan et al., 2020).

Google Classroom was selected because it complies with the International Society for Technology in Education (ISTE) standards and is simple to use (Wan Hassan et al., 2020). In contrast, YouTube video media was employed for practical courses (Azzahra, 2020).

Some reasons regarding the benefits of the Google Classroom utilized in vocational higher education. First, it has a reasonable number of features and can be used for no cost (Fauzan & Arifin, 2019). Besides, Google Classroom could improve communication between students and educators. For example, students have until the deadline to turn in their assignments. In contrast, teachers can check students' work and provide personal feedback to improve it (Kholifah et al., 2020).

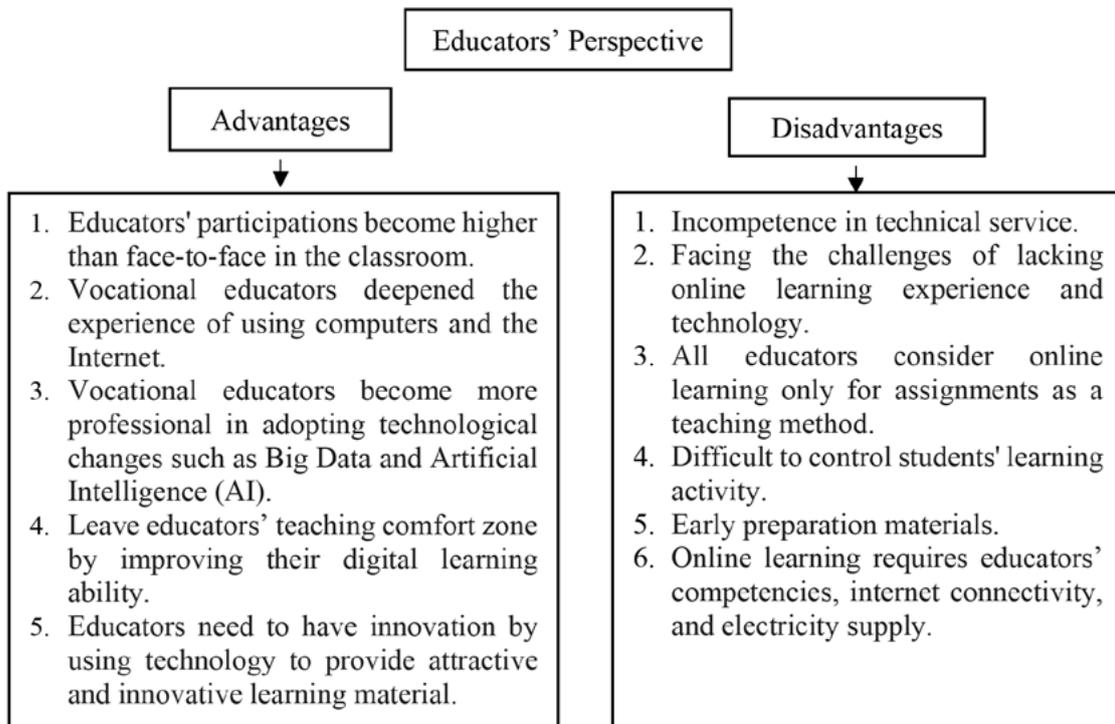
While YouTube video is the most common type of practical learning educators employ at vocational higher education (Kholifah et al., 2020), the reason is that video is an effective medium for assisting the learning process of occupational practice skills individually and in groups. Students may be reached directly through videos. It includes non-printed teaching materials that are both rich in content and complete.

Furthermore, YouTube video adds a new dimension to learning vocational skills. Because video media is a technology that displays images combined with audio, it can offer learning materials, particularly for students taking practical courses (Kholifah et al., 2020; Rabiman et al., 2020). Briefly, YouTube video has numerous advantages as an essential online learning medium in delivering practical learning materials in vocational higher education since the COVID-19 pandemic.

## II. The Impact of Online Learning in Indonesian Vocational Higher Education

As online learning was first employed in vocational higher educations, it is essential to examine the perspectives of both educators and students on the advantages and disadvantages of online learning. Therefore, several types of research have been carried out related to the educators' perspectives on online learning, as mentioned in Table 1 below.

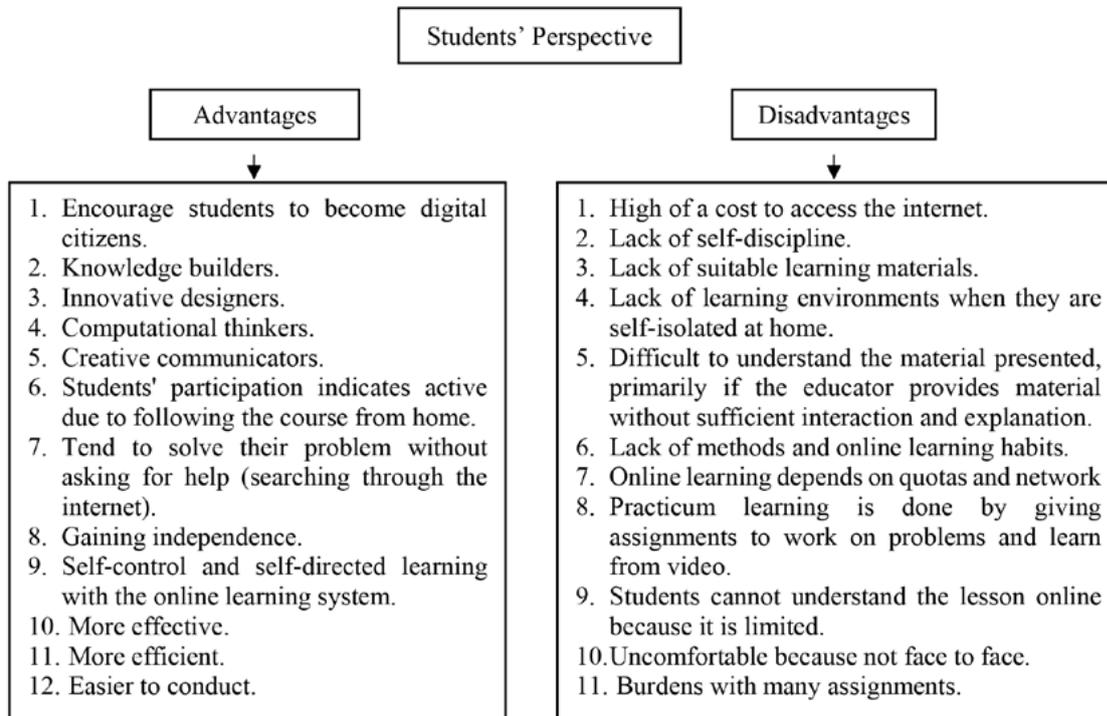
Table 1. The Educators' Perspective



The COVID-19 pandemic has decreased learning activities and degraded educators' performance (Yuan et al., 2020). Therefore, educators in vocational higher education should make their teaching methods attractive, practical, and understandable to students in online education. Moreover, to optimize online learning, they must utilize technology to develop their teaching material, particularly since the pandemic.

Based on the findings, students in vocational higher education have both good and bad experiences in online learning classes. Students assume that online learning creates barriers to providing a better learning environment and practical skills and competencies. While online learning also demonstrates some effectiveness for students. It connects students with learning resources at any time and from any location, even if they are physically separated, enabling them to engage and collaborate synchronously or asynchronously (Kholifah et al., 2020). Table 2 shows the students' perspectives related to online learning classes.

Table 2. The Students' Perspective



## V. Conclusion

Indonesia, as one of the Southeast Asia countries, experienced a slump in the education sector. The MOEC implements online learning to prevent the transmission of the COVID-19. Online learning is an excellent way to keep students right to acquire knowledge but remain safe at home. In a pandemic, vocational higher education must encounter an uncommon massive transition in the teaching and learning process as a challenge and an opportunity.

Since the pandemic, Google Classroom and YouTube videos link educators and students in vocational higher education's teaching and learning process. With its number of features and no cost, Google Classroom has become a trend and familiar to educators and students in online learning. It was also chosen and recommended by MOEC because it complies with the International Society for Technology in Education (ISTE) standards and is simple to use.

Meanwhile, YouTube video is the most common practical learning educators utilize at vocational higher education. YouTube video adds a new dimension to learning vocational skills. It displays images combined with audio, can offer learning materials, particularly for students taking practical courses. Besides, it is an effective and appropriate media for assisting the learning process of occupational practice skills, both individually and in groups.



**BACK**

Since online learning was first employed in vocational higher education, there have been dynamic changes in learning and teaching. Therefore, it is essential to explore both the educators' and the students' perspectives about the impact of online learning. Furthermore, educators and students have to minimize the disadvantages of online learning to face a new age of education, particularly during the attack of the COVID-19 pandemic.

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# Mitigate the impact of COVID-19 towards TVET Governance in Bangladesh

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## Abstract

The article provides an evolutionary discourse of the Technical and Vocational Education and Training education in the context of academic and scholarly debates and importance in globe. Although the term TVET is not without any argument, the paper emphasizes its importance and scope by unveiling the crisis and recuperating loss of total education for TVET. It provides learners requisite knowledge and skills for employment. TVET is treated as one of the most important tools for social equity, inclusion, balance and sustainable development. But the continuum of the global pandemic COVID-19 massacred the system with bottlenecks. The holistic use of Information and communication Technology applications and online platform helps to accelerate its operation for wrapping deficiencies. The TVET thoughts of post COVID-19 planning try to mitigate TVET loss in integrated approaches.

**Keywords:** Online platform, bottlenecks ailment, integrated approaches, policy governance

## 1. Introduction

The impact of a global pandemic on the world is felt. Education is defeated. The article brings into focus the crisis of Technical and Vocational Education and Training (TVET). This is the first time in the history of the country that educational institutes have been closed for such a long time. The schedule for at least three academic years, including 2020, 2021 and 2022, has been cut short due to the coronavirus epidemic. Educationists, teachers and parents are thinking about what to do now to compensate for the huge loss of education in the uncertainty of when the epidemic will subside. They urged the government to take a coordinated decision with utmost importance.

The learners of different levels and platforms have suffered the most from the horrific outbreak of corona. Some of them will come out in the fourth year and prepare for the job as soon as they take the exam. But they are stuck. As a result, their careers are under threat. Students as well as teachers are in crisis. Online classes have also started using social networking platforms like Facebook, YouTube, Google and Zoom not covering holistic education; going with trial and error. But there have been attempts to take classes through virtually across the country. However, it could not go to many places. For example, there are network problems in islands, haors and hilly areas (i.e. center to periphery).

It is a great challenge for the country to make up for the multidimensional damage caused by the closure of educational institutions. Teachers and concerned people say that a large number of students are forgetting their studies as they have been out of the classroom for a long time. It is also not possible to test the learning ability by not taking the test. Many students are getting involved in various occupations without finishing their studies. According to the World Bank, about 36 million students in Bangladesh have missed out on the opportunity to learn properly and interact with their peers. It affected their learning experience. Blended learning methods of TVET training learning such as online learning and direct classroom-based hands-on learning are major objectives for scaling up VET.

By studying the term TVET from different perspectives the paper reveals the crisis and thrust of TVET as a rethinking, integrated approach in combination planning of Information and communication Technology (ICT). Education embraces an enormous number of diverse activities and is structured for different occupations. The paper is an attempt to focus on the conceptual framework and suggest some solutions to recover great loss of time for COVID-19 pandemic. Attempts have also been directed towards the condition of Bangladesh which is affecting both the development and education system as well as job placement. Rethought squeeze and blended system for recovering scarcity of TVET during COVID-19.

## 2. Perspective of TVET

From the modern perspective, education means literacy and numeracy, on the other hand, TVET focuses on skills education and creates employable opportunities for graduates. A major person can read, write, and calculate knowledge is built up in a systematic way, and the ideas are smoothly disseminated and accumulated (Cannoy,

1992.p.4) but in the age of technology integration. TVET produces hands of skilled force. Traditional education puts more emphasis on the harmonious development of all powers and capacities of all the individuals. Thus, according to the Aristotelian conception, education meant, „to develop man’s facilities, especially his mind so that he may able to enjoy the contemplation of the supreme truth, goodness and beauty in which perfect happiness essential consist“ (Wahiduzzaman and Huda, 1998, p.185).

Despite the ambiguities, education is usually defined as the formal process by which a society transmits values, skills, and knowledge from one person or group to another (Rahman, 1987). It is thus both a means of social reproduction and empowerment leading by technical education (TE). Nowadays, the return of TVET is more than general education (Malaque, 2019). TE is popular as informal education which currently occupies a place like formal process. It is the most vital element in combating poverty, empowering women, promoting democracy, protecting the environment and controlling population growth (UNICEF, 1999. p.13)

It operates as the means of freedom through which men and women participate in the transformation of their world. And promote social development within the context of socio-economic and political environment (World Bank, 1999, p.5). Remember the wise quote of TVET that amazes us *‘While education is the key to any development process, TVET is the master Key that can transform the world of work and the economy, alleviate poverty, save the environment and improve the quality of life’ ...* (Luisoni, 2005)

### **3.Methods**

This study is a combination of different viewpoints of research. Here about 7 qualitative approaches have been combined. The article has been compiled through critical quality research and various journals observation. Collecting and working with non-numeric data and interpreting meanings from these databases is just a concerted effort to see a simplification solution ongoing TVET crisis mitigation. In this study, through further research, the online version of TVET will help to reach out to remote areas in connection of ICT. New mindsets and attitudes will emerge, education management and teachers. Therefore, the study looks into qualitative researchers have looked at the need and relationship of meaning, interpretation, symbolism, and ongoing learning methods, Internet processes, and relationships. Easy solutions and bridges of crisis have been bridged.

generated and spread by social media users, has become the right tactical of conventional and online platforms of education science. A simple solution and path has been shown through this study for ICT and education governance. Everybody's thoughts have been adjusted from expert opinion including continuous literature review. To prepare this research journal, precise techniques, and following methods were used:

- Review reports of international development agencies on TVET
- Examine news journal articles relating to the research initiative of TVET
- Discussion with TVET experts, academics and incorporate their comments
- Analyze and compare information related to TVET
- Observation of current situation, podcast, and zoom webinar meeting
- Corresponding to the Google Scholar website within TVET scholarly articles
- Compile information and analyze with COVID-19 pandemic constraint

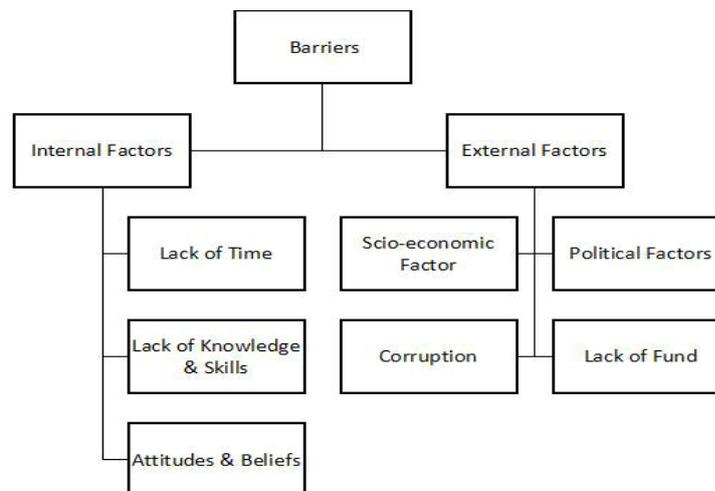


Fig. 1. The diagram shows the barrier of TVET in Bangladesh

#### 4. Education in different forms

Although the term education includes such conceptual ambiguities, in general it has been placed into three categories: formal, informal, and non-formal. Formal education refers to the highly institutionalized, chronologically graded and hierarchically structured education system spanning the lower primary school and the upper reaches of the university (Coombs and Ahmed, 1974, p.8). It is basically an institutional activity, uniformed and subject-oriented (Daham and Bhatnagar, 1980.p.6), due to which an obligatory curriculum (Illich defined as the age-specific, teacher related process requiring full time attendance at an obligatory curriculum (Illich, 1973, p. 25-

26).

The term non-formal was coined in the 1960s (Coombs, 1985, p. 22); the act of learning is as old as mankind (Brembeck and Thompson, 1973, p. xiii). While the new interest in non-formal education is a weapon of employment. It has been considered an old activity with a novel term (Kedrayate, 2002). NFE is an organized and semi-organized educational activity opening outside the regular strictures. The formal system aimed at serving a great variety of learning needs of different sub-group in the population, both youth, and old (Coombs, 1985, p. XXXIV).

Indeed, more than seventy years ago the nations of the world, speaking through the Universal Declaration of Human Rights on an international scale, the right to education still remains an empty promise for millions of children, women and men in today's world. In the Millennium Declaration (MDG) in 2000 and Sustainable Development Goals (SGD) in 2015, member states of the United Nations accordingly affirmed that they would spare no effort to free their fellow men, scarcity and achieve universal basic education (UNICEF, 2018, p. 1). Nevertheless, TVET occupies spaces for poverty reduction by employing entrepreneurial growth.

Tolstoy, more than one hundred years ago, in his article „On the education of the people“ demonstrated the contradiction between the universal demands of the people for education. And the universal failure of popular education as provided in the school system and its nature preferred to emphasis on „criterion on pedagogy-freedom. Learners must have the option of choosing their own learning subjects (Tolstoy, 1882, p. 62).

## **5. Scale up Technical Education**

Science and the interest in „out of school education generated a multitude of experiments, the report of the World Bank in Education Sector Working Paper, 1974 also revealed the fact that formal education systems „irrelevant to the needs of developing countries for the past two decades“ (Bishop, 1986, p. 50). TVET thus grew up at a time when (i) education was in a state of discontent, (ii) development was coming to mean overcoming disadvantage and (iii) certainty meant closing between one or two alternatives. The result was naturally a search for an alternative to the formal education system (Rogers, 2004a, p. 58-64).

Their world's vision is to end the global education crisis and unleash the potential of the next generation. Despite the SDGs to have every child in school and learning by 2030 (Specially Goal4), there are still 260 million children who don't go to primary or secondary school ([reliefweb.int](http://reliefweb.int), 2020). Figure 2 is globally followed crux of SDG and goals are intertwined. And

figure 3 non leaner relationship founded in TVET skills and productivity (Rabbani, 2021). Consequently, at the same time, the economic and social development of countries around the world is hampered by the storage of skilled men and women. The great loss is never covered.



Fig.2. Source: <https://sdgs.un.org/goals>  
[dhakatribune.com/opinion](http://dhakatribune.com/opinion)



Fig. 3. Source: <https://www>

## 6. Learning and Problem Solution

Although education questions the acceptability of learning strictly organized within a limited span. That does not mean that it is a panacea or a magic solution to the problem. While it is intended for all age groups and sections of society- children, youth and adults, working men and women (Dahama and Bhatnagar, 1980, p. 8). It has been engaged as an alternative system with the expectation to bring about a positive change in the society.

If we do not put the human population at the core of SDG agendas, our efforts to improve human wellbeing and to preserve the quality of the environment will fall. Actually, population is an asset for every country but over population has been a problem and barrier for development. Thus emphasis has towards TVET journey for IGA growth and a smiling society. In an awkward position is to upgrade policies and instrument for sustainable development due to population.

Rapid progress of any country largely depends on proper education, which can be regarded as a social investment of high priority for each and every state (Awal & Aminur, 2007). In fact, skilled and educated people can place their families, countries in a high and exalted position with mundane gains, also facing challenges and grasping opportunities will be able to pressure professional goals with knowledge and equanimity. It is necessary to know for the assessment of job opportunities for social science graduates that linkage of TVET in Bangladesh and for the assessment

of availability of jobs in terms of graduate's interest (Maleque, 2020). In recent years, many international, national and local NGOs are providing TVET education to increase income of the poor and disadvantaged groups of Bangladesh. The learner gains both technical skills and entrepreneur assistance.

## **7. TVET and Youth Empowerment**

In terms of hidden social issues, child marriage is rampant across the country and has caused many young girls to drop out of education. The scenario is much more in COVID javelined our lives and settled us bottlenecks. Those girls become mothers at an early age and forgo their contributions to the country and their development. Besides, this boys are engaged in different unethical and harmful activities. The great loss of the world is wrapping into the darkness of adolescence and youth. The pandemic has harmed these girls and young mothers in multiple aspects of their wellbeing. We must work on improving their professional future and engaging with floating skill training. Even, if it may provide them psycho-social support and vocational assistance and intensive reskilling programs.

89.2 percent of youth aged 15-29 years are working in the informal sector, which is worst hit by the COVID-19 pandemic. The budget allocation for the Ministry of Industry of Bangladesh has declined by 8 percent; for the Ministry of Labour and Development; it has declined by 4.6 percent; and the budget for the Ministry of Expatriates' Welfare and Overseas Employment has increased by 9.4 percent. These ministries directly contribute to employment generation (The Daily Star, 2021).

In general, Polytechnic is a multi-technology TVET educational center. There are various technology, learning facilities, such as a large number of teachers, advanced laboratories, large workshops, etc. The emphasis here is on learning to "work". In contrast, learning in technical schools is much more noticeable. The Number of teachers here is comparatively less. The number of students is not high. Only a few technologies are taught here, but space is enough. The scope of knowledge is heavier than the work here.

## **8. TVET & ICT in Development**

In order to increase the participation of girls in TVET education, it is necessary to expedite the establishment of more assistance in existing learning facilities and ICT. There is a need to provide more scholarships to the students and to facilitate their employment after graduation. The role of the private sector in technical education

is increasing day by day. Private entrepreneurs need to be encouraged. The area, if patronized, would create a green youth development hub. They provide youth learning facilities in different modular courses by occupying technical experts' planning. Apart from that, if financial assistance, including stipends, is provided to the students of private institutions, their participation will increase.

About two-thirds of the total population in Bangladesh is young. Technical education is very important in their employment and self-employment. Apart from that, there is a considerable demand for skilled manpower in foreign employment as well. In order to make TVET meaningful for the overall development of the country, further expansion of technical education and initiatives to ensure quality technical education are required. As a result of the assistance to technical schools at the sub-district level, technical education is taken up by the students. It would be thought and create different mobile training and resource pools.

Initiatives need to be taken to introduce technical education in new subjects as per the needs of the age. Apart from that, the existing syllabus needs to be modernized and revised according to the needs of the age. The introduction of „skills-based“ training in all fields of vocational education will lead to overall development of skills. Apart from that, many people in various fields acquire skills informally but do not get official recognition where they need recognition as standard. If their recognition is arranged, their dignity will increase and it will open new opportunities to get good jobs abroad.

In the days ahead, global technology dependence will undoubtedly increase exponentially. In the present and future world, technical skills will play a big role. The world of tomorrow will be more technology driven, change oriented, and corresponding to IR 4.0. So those who are ahead in acquiring technical knowledge related to technology will be better. In order to sustain their position in the world of the future, students who plan to build a future. General education also needs to acquire technical knowledge in addition to regular studies needs to be made more dynamic force.

## **9. Modern world and techno-skills**

Skill is the hallmark of modernity. Unskilled work is unnecessary. And the modern world is technology dependent. Here the thought of development without skills is futile. As a result of new discoveries in science and technology, development strategies and methods are changing rapidly around the world. As a result, developing countries are constantly participating in unequal competition in manpower exports and local play. Meanwhile, although Bangladesh is small in size, it ranks eighth in the world in terms of population (Nitai Sutradhar, 2021). Therefore, if the huge population turns

into human resources, the path of development of the country will be much easier. So far, the main focus would be on our developments are skill readiness for IR 4.0 and generating youth working force is must.

Skill is the hallmark of modernity, and unskilled work is unnecessary. And the modern world is technology demand driven. The world of tomorrow will techno-leading and change oriented. So those who are ahead in acquiring technical knowledge related to ICT, rapidly changed. The wave of change and upgrade of technology must be adoptable technology for surviving the hidden global competition.

## **10. Conclusion**

According to the National Education Policy-2010 of Bangladesh, the objective of technical and vocational education is to create a skilled workforce through technical education and to create massive employment. Manpower exports with a view to rapid expansion of quality skilled manpower through appropriate technical knowledge, economic development opportunities and labor market. The skill development will support both domestic and international periphery if harmonize techno-driven integration. The TVET problem is two-fold - lack of skills and lack of organizational capacity to utilize skills (Mehnaz Rabbani, 2021).

Finally rethink educating tomorrow's workforce today's plan. Incorporating mobile learning platforms and enhancing ICT resources, policy governance helped to reduce evil times and disrupt the last few months of COVID-19 lockdown never ever imagined on the planet. Finally, emphasizes should be addressed in the standard and quality online TVET education and policy governance.

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# **Trends And Issues In The Technical And Vocational Education In 10 Indo-pacific Countries**

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## **AUTHOR NOTE**

The ideas and opinions expressed in this paper are those of the author; they are not necessarily those of his affiliation.

## **Abstract**

Timely analysis of trends and issues in TVE can help TVE stakeholders cope with rather than oppose them. Educating in the direction of the trend and resolving the important issues can maximize TVE's chance of success. The purpose of this paper was to identify trends and issues in the TVE in 10 Indo-Pacific countries. To achieve this purpose, a cross-country analysis with a word cloud analysis was employed. Consequently, the following nine trends were identified: (1) Accelerated adaptation to emerging technologies and the evolution of industry; (2) Improving or diversifying TVE accessibility and increasing the enrollment rate; (3) Enhancing alignment between the TVE and higher education sectors; (4) Promoting employment-based, work-based, or competency-based learning models; (5) Strengthening TVE educators'/trainers' practical skills, industrial working experience, or qualification requirements; (6) Gearing TVE with lifelong learning; (7) Encouraging employer or industry involvement in TVE; (8) Enhancing quality assurance and autonomy in the TVE system; and (9) Providing more career counseling or career exploration. In addition, the following six issues were identified: (1) TVE does not have the same positive public image as academic education; (2) Insufficiency of qualified TVE trainers/teachers; (3) Extreme challenges to teach hands-on skills online; (4) Weak involvement of social partners; (5) Fragmentation of TVET management; and (6) The continued lack of a well-constructed qualification framework and quality assurance system.

*Keywords:* technical and vocational education (TVE), trends and issues, Indo-Pacific region, comparative analysis

## **Introduction**

Taiwan and more than 20 other countries/political entities in the Indo-Pacific Region are located between the Indian Ocean and the Pacific Ocean. Regardless of economic development or strategic geography, they all play a pivotal role in the global deployment. How they develop talents by means of technical and vocational education (TVE) has drawn Taiwan's attention. Aiming to achieve the following three goals, a nonprofit book entitled "Trends and Issues in International Technical and Vocational Education in the Indo-Pacific Region" (afterwards called the TVE book; Lee & Lee, 2021) was published in September 2021: (1) to strengthen the mutual understanding and connection of TVE between Taiwan and the other countries in the Indo-Pacific Region, (2) to expand more cross-country educational cooperation and flow of talent, and (3) to take advantage of the core competencies and achievements of TVE in neighboring countries as a Taiwan innovation reference for change (Peng, 2021).

Dr. Yi-Fang Lee and this author served as editors-in-chief of the TVE book. They formulated manuscript guidelines including cross-country comparison components, invited technical and vocational educators from 10 countries in the Indo-Pacific region to follow the guidelines to write up country-specific chapters, conducted a peer-review of all manuscripts and requested authors to make necessary revisions, and made a cross-country comparison which is presented as the 11th chapter. This book compiles country-specific articles about TVE profiles, the status of TVE, and trends and issues in TVE from 10 countries, namely Australia (AU), India (IN), Indonesia (ID), Japan (JP), Korea (KR), Malaysia (MY), Singapore (SG), Taiwan (TW), the United States (US), and Viet Nam (VN). Each country has a book chapter.

Timely analysis and understanding of the trends and issues in TVE can help TVE stakeholders cope with rather than oppose them. Educating in the direction of the trend and resolving the important issues can help to maximize TVE's chance of success. The purpose of this paper is to identify the trends and issues in the TVE in the 10 Indo-Pacific countries stated earlier. The term "trend" is defined as a general direction in which something is developing or changing. The term "issue" refers to an important topic or problem for debate or discussion.

## **Methods**

To achieve the above purpose, a cross-country analysis with a word cloud analysis was employed. Aiming to realize differences and similarities with respect to the components analyzed, a cross country analysis is a comparison of some specific components of analysis across countries (IGI Global, 2021). A word cloud is a visual representation of word frequency. Aiming to identify the focus of written material, a word cloud analysis is a simple method not only to analyze the content of the text, but also to display the higher frequency words in the text in a larger font (Atenstaed, 2012).

The data analyzed in this paper were extracted from the TVE book and processed as follows:

### **1. 10 country-specific TVE trends and issues**

For the TVE book, every book chapter author(s) was/were requested to keep the length of each chapter between 10,000 and 12,000 words, and to state 5-10 TVE trends and issues, respectively. For this paper, each country's TVE trends and issues were extracted from the 10 country-specific chapters and combined into two files, trends and issues. The two combined files had more than 14,000 and 17,000 words, respectively. The two files were separately imported into the online word cloud generator, HTML Word Cloud, to generate two word clouds, shown as Figures 1 and 2. When examining the word clouds, common English words were ignored. The word clouds were applied to confirm and make up the data described below.

### **2. A cross-country comparison of TVE trends and issues**

As stated earlier, there is a cross-country comparison of TVE profiles, the status of TVE, and trends and issues in TVE in the 11th chapter of the TVE book. The comparison components were prescribed in the manuscript guidelines and sent to authors when they were invited to make contributions to the TVE book. After the peer review process and necessary revisions of a manuscript were completed, the comparison components were drawn from the manuscript and listed in a comparative table to request its author's/authors' confirmation. After that, the 10 comparative tables were combined and a cross-country comparison of TVE profiles, status of TVE, and TVE trends and issues was made by the two editors-in-chief of the TVE book and one of their graduate students, Ms. Hoang Bao Ngoc Nguyen. In this paper, the comparison of TVE trends and issues was extracted from the 11th chapter of the TVE book. The extracted data were reexamined with the two word clouds, shown in Figures 1 and 2, and necessary supplements as well as rephrasing were made.



3. Enhancing alignment between the TVE and higher education sectors  
Enhancing vertical alignment between the TVE and higher education sectors was reported by AU, ID, JP, and MY.
4. Promoting employment-based, work-based, or competency-based learning models  
Employment-based, work-based, or competency-based learning models and apprenticeship have been promoted in AU, IN, JP, TW, and US.
5. Strengthening TVE educators'/trainers' practical skills, industrial working experience, or qualification requirements
6. Gearing TVE with lifelong learning

In order to provide workers with different and up-to-date skillsets to adapt to the rapid changes in technologies and industries, TVE has been geared with lifelong learning (KR and SG).

7. Encouraging employer or industry involvement in TVE

The involvement includes providing financial support, curriculum advice, internships, and practical empowerment of TVE school teachers (TW and US).

8. Enhancing quality assurance and autonomy in the TVE system  
This trend was reported by countries such as IN, JP, and VN.
9. Providing more career counseling or career exploration

In order to support students in achieving their education and career goals, more career counseling or career exploration have been provided (TW and US).

## **Issues in TVE**

It was found that the issues in TVE are very country-specific, and every country is confronted with many TVE issues that should be resolved. Here are some examples. In AU the complexity of the TVE system makes it difficult for students to navigate and to make informed choices about where and what to study. KR reported that TVE policy changes usually occur when the president or superintendent is replaced. TW reported insufficient TVE regulations and the lack of a rolling adjustment mechanism in the regulation system leading to TVE development.

Linked to Figure 2, six major issues observed in two or more countries among the 10 are as follows:



social partners such as employers and industry bodies to ensure its relevance and effectiveness. However, there is an ongoing challenge with TVE remaining relevant to both industry and students (e.g., AU, ID, IN, JP, KR, MY, TW, and VN). For example, most companies lack the driving force to work on industry-academia collaboration with schools (JP and TW). For another instance, the passive participation of industries and related ministries was found in Korea. Furthermore, in Malaysia, the profit-oriented companies and industries are reluctant to join in students'/trainees' skill training so that TVE solely depends on government funding.

#### 5. Fragmentation of TVET management

It is often found that there are multiple ministries or departments administering TVE management (ID, IN, MY, and VN). For example, the skill development structure in IN is spread across more than 20 ministries and departments, but there is no strong monitoring mechanism to ensure convergence. Indonesia reported that there are several ministries taking charge of TVE but policy and program synchronization would take time to take place.

#### 6. The continued lack of a well-constructed qualification framework and quality assurance system

This issue is mainly reported by countries such as JP, IN and VN. For example, in VN, there is a lack of publicly available and reliable data on TVE to systematically monitor the performance of the TVE system. Likewise, IN reported that the assessment and certification systems are not harmonized and standardized, which makes the systems less acceptable to employers. In addition, the unequal access to TVE is a problem reported by MY and US.

### **Conclusion**

To sum up, TVE stakeholders can not only follow current trends identified in this paper but also create new trends to make a difference. Furthermore, resolving issues means making progress. To effectively resolve prevalent issues and enhance the quality and effectiveness of the TVE system, the TVE stakeholders in the Indo-Pacific Region can work together to gain the synergy of collaboration.

It is also suggested that more details regarding the concerns mentioned in this paper can be learned by reading the TVE book. In addition, we have to keep identifying TVE trends and issues.

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# **Alternative Digital Learning During The Covid-19 Pandemic - Augmented Reality Implementation**

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## **Abstract**

The Covid-19 pandemic that has hit the world, followed by social restrictions to reduce the spread of the C-19 virus has increased the use of online learning platforms in education. The policy of temporarily eliminating face-to-face learning has an impact on practical learning in laboratories and workshops in vocational education which is full of physical activities, both interactions between friends and lecturers and with tools to form certain skills. Utilizing augmented reality digital learning tools that can be used offline and online is expected to bring the learning experience closer to face-to-face learning, although the skill results are still better when carrying out face-to-face practicums. The objectives of this study are 1) to reveal alternatives to digital learning in the pandemic era, especially in the Civil Engineering department; 2) knowing students' perceptions of the ease of using augmented reality in learning the construction of wooden roofs; 3) determine the readiness of students to apply augmented reality in learning the construction of wooden roofs.

This research is a descriptive study with 104 respondents of vocational students in the field of civil engineering at Yogyakarta State University. Deciding on the alternative use of digital learning in this case augmented reality is carried out through the choice of several learning media platforms by considering the nature of the courses and the availability of resources, while the content is developed independently according to the construction of wooden roofs. The ease of use of augmented reality media that was developed was measured based on the average of several aspects related to the ease of use of media in general. Students' readiness to learn with augmented reality media is measured in detail through USE and cognitive skills definition (Arnold Lund, 2001, MyBrainWare, 2019)

The results of the study on vocational learning are 1) alternative digital learning in the pandemic era using augmented reality media; 2) the average perception of the ease of use of augmented reality in learning the construction of wooden roofs is 93%; 3) student readiness in applying augmented reality to the review of wooden roof construction for aspects of usefulness of 4.67 (high), easy of use of 4.608 (high), easy of learning of 4.745 (high), satisfaction of 4.718 (high), and easy of cognitive skills of 4.758 (high). Even though it is obtained in the high category, especially in the easy aspect of cognitive skills, in reality, when compared with face to face learning, it cannot be compared because it needs further research.

**Keywords:** augmented reality, wooden roof construction, vocational learning

## INTRODUCTION

Construction has a crucial role in human life. From the perspective of society, construction determines where and how people perform their daily activities. For example, in the United States, people spend an average of 90% of their time indoors

[1]. The buildings and materials used in their construction and its completion have a profound impact on their occupants' health and well-being. From an economic point of view, the construction industry is expected to proliferate with revenues of around \$15 trillion in 2025. Currently, more than 100 million people are working in construction worldwide [2]. Meanwhile, Indonesia is actively developing infrastructure; therefore, skilled human resources in construction are needed. One review aspect of the Indonesian government's focus is studying at the vocational education level, where the main objective is to produce graduates with a high level of employment according to industry needs. To achieve the government's goals in preparing middle-level human resources who are productive, creative, innovative, and able to compete globally in the 21<sup>st</sup> century, education in Indonesia needs to be improved. One of the ways is through learning innovation at vocational education.

One of the vocational education that expert in the field of construction in Indonesia is Yogyakarta State University. Based on observations, students in this field still use modules as teaching materials. The material discussed in the majority of the modules is in the form of various kinds of 2D and 3D building drawings, such as simple houses, multi-story buildings, bridges, dams, irrigation, and production infrastructure. This material requires excellent imagination, and need innovative learning media that can help improve student understanding.

Augmented Reality (AR) is a technology that combines visual images with the real world, where the visual image will be displayed with the help of a particular device [3]. AR is a variation of Virtual Reality (VR). VR technology brings the user into a virtual environment, and the user will not be able to distinguish the real objects around the user. Through AR, users can see a virtual environment combined with the real world encompassing them. Therefore, AR adds to reality, instead of replaces it. AR will be beneficial for the world of education in presenting virtual 3D educational objects; therefore, it is expected that users can be more interested and understand the knowledge conveyed. AR is gaining popularity and the development of internet and smartphone technology, where AR applications can be downloaded and work in real-time using Android and iOS smartphones. Meanwhile, the number of Android smartphone users in Indonesia is the largest, reaching 92.3%, followed by iOS at 7.5%, and the rest are other operating systems [4].

AR is divided into two methods; specifically, Marker Based AR and Markless AR. Marker is an image file that will later function as a trigger, which will be recognized by the camera to operate AR applications [5]. Markers are uploaded to the Vuforia system, an AR Software Development Kit (SDK) for mobile devices that enables the creation of AR applications [6]. Marker-based AR has been widely applied in various fields such as education [7, 8], health [9, 10], culture [11, 12], entertainment [13, 14], industry [15, 16], et cetera. On the other hand, markerless AR methods are developing rapidly recently. This method does not require a marker to display 3D objects. Markerless AR tracks objects that exist in the real world without special markers [17]. The surface of a marker object replaces the use of markers as tracking objects as a tracking object. Markerless tracking is supported by pattern recognition techniques done by calculating the position between the user's camera and the real world without any reference, only using natural feature points such as lines, edges, and corners. The applications of Markerless AR have yielded positive results. For example, Renukdas et al. [18] have produced an Android-based Markerless AR for interior decoration. They stated that the AR method that has been applied could be developed and extended to the fields of architecture and civil engineering. Another example is the research of Hammady et al.

[19]. They have successfully researched the user experience of markerless AR application at the Leeds museum and Egyptian museum in Cairo. The results show that 77% of participants from both museums felt that the use of AR technology in museums could increase their interest and excitement. More than 70% of participants agreed that AR technology encourages them to interact with one another.

## METHODOLOGY

This study is a descriptive study with a review of vocational students in the field of civil engineering at Yogyakarta State University. The number of samples taken in this test were 104 respondents. The use of digital learning in this case is augmented reality, this is because based on the results of interviews and the existing conditions of the device that is easily obtained and used by respondents is a smartphone, so that the connection with the use of digital media is carried out by considering the nature of the course and the availability of resources. The learning review used in this study is a wooden roof construction learning material. This lesson was chosen because the nature of learning about wooden roof construction requires pre-survey activities before practice/theory, so that during the COVID-19 pandemic it is impossible to do. So that it is very suitable for AR development to choose wooden roof construction learning as an introduction learning theory.

The aspect that is measured in this study is the ease of use of augmented reality media which was developed and then measured based on the average of several aspects related to the ease of use of the media. Students' readiness to learn with augmented reality media is measured in detail through the definition of cognitive skills including easy of use, easy of learning, satisfaction, and easy of cognitive skills [20, 21]. The data in this study were obtained from the results of a survey conducted using augmented reality media for wooden roof construction, the data was tabulated and analyzed descriptively and then categorized based on the aspects of the discussion review.

## RESULT AND DISCUSSION

At this stage, the team maps the needs of users, which will later be used to build software development. For this reason, the team made observations and interviews at vocational education in the field of civil engineering at Yogyakarta State University. Based on interviews, one of the materials that requires high imaginative abilities is the construction of wooden roofs material. Students need innovation in learning media to increase their interests and excitement, especially in the construction of wooden roofs material. The developer then uses AR markerless media that contains construction of wooden roofs material due to relatively easier to implement students. In the AR there is a submenu where users can see various connections used to build construction of wooden roofs displayed as 3D objects

At this stage, the team uses the AR construction of wooden roofs application design with Unified Modeling Language (UML). System design is illustrated through a diagram of use cases, sequence diagrams, and activity diagrams. Figure 1 shows the programming process of AR construction of wooden roofs which has been tailored to the needs of users. To operate the AR construction of wooden roofs, users must first install the application. After that, the user can open the application, starting with the main menu option. Through the main menu, users can choose submenu to see 3D construction of wooden roofs objects and their various connections. In this process, the system contains 3D objects that have been stored in the application database, then display it to the user.

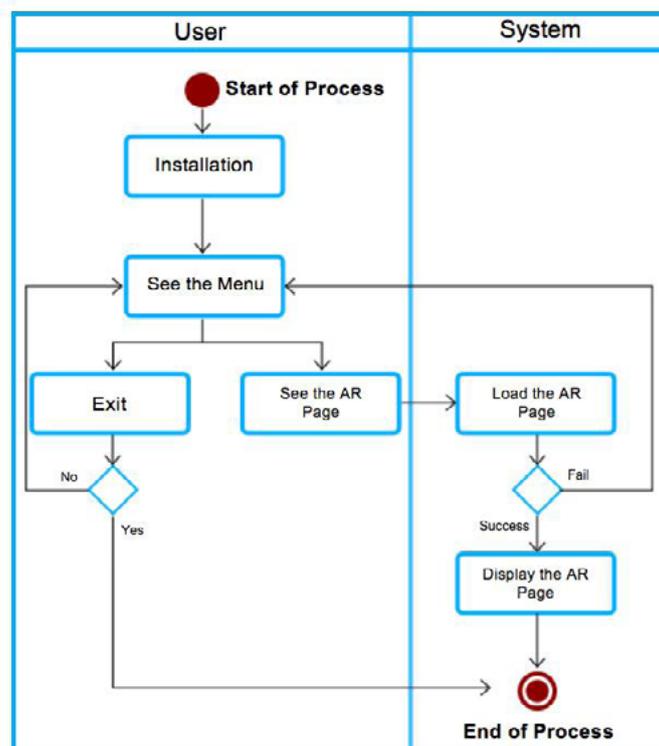


Figure 1. Activity Diagram AR

At this stage, the team arranged programming to build AR construction of wooden roofs. Programming Implementing Unity 2019.2.19F1 software, Java JDK, Android SDK package, AR Foundation, and Arcore XR plugin contained in the Unity Package Manager. This type is chosen because of the most suitable and easy to use by users, so it won't experience difficulties. The Android platform is selected, given that this platform is open to developers in making applications according to their needs.

During the process of using AR construction of wooden roofs, users can provide input to the programmer. Based on this input, the developer prepares refactoring, making changes to the software code to improve the quality of the application without changing the way the program works. Refactoring is done to follow changes in requirements during the application development process; This is a specialization of

extreme programming. After all 3D objects are established, programmers export 3D objects to unity. Figure 2 presents an object of 3D construction of wooden roofs truss that has been exported to unity to be used in learning in vocational education.

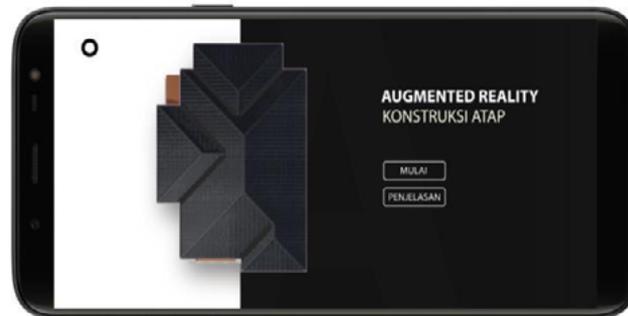


Figure 2. Construction of Wooden Roofs at Unity

On this occasion the programmer tested the unit of all programming codes to remove bugs. Figure 3 is an AR construction of wooden roofs application that has been completed and ready to operate on an Android smartphone. On the main page of the AR construction of wooden roofs application, there is a sub-menu to the 3D camera object page, which is the core of the application. On this page, users are asked to scan items on a flat surface such as tables, chairs, sofas, laptops, and so on. After the process of scanning is successful, the surface of the item will display the black border, which users can knock to bring up the 3D construction of wooden roofs truss object. Furthermore, 3D objects can be moved by users on the smartphone screen for user convenience. On the application screen, there are ten types of connection options used to build construction of wooden roofs. When the user selects a connection, the application will display the connection location on the construction of wooden roofs [22]. Users can also see animated connection installations according to requirements during identification.

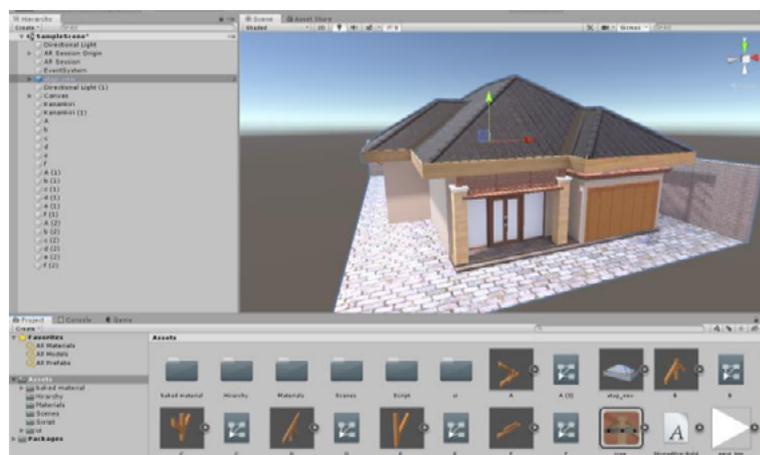


Figure 3. Markerless AR Application Construction of Wooden Roofs

Testing uses the definition of cognitive skills. This standard is international standards in software testing [24] and the readiness of users in implementing AR. The aspect applied at this stage is easy of use, easy of learning, satisfaction, and easy of cognitive skills. This test is done to determine the extent to which a product or system has a suitability of needs when employed under certain conditions. This test also aims to determine the extent to which applications can function efficiently with other systems without damaging the system. Usability testing is done to determine the extent to which applications can be utilized by users to achieve goals effectively, efficiently, and with satisfaction in the user context.

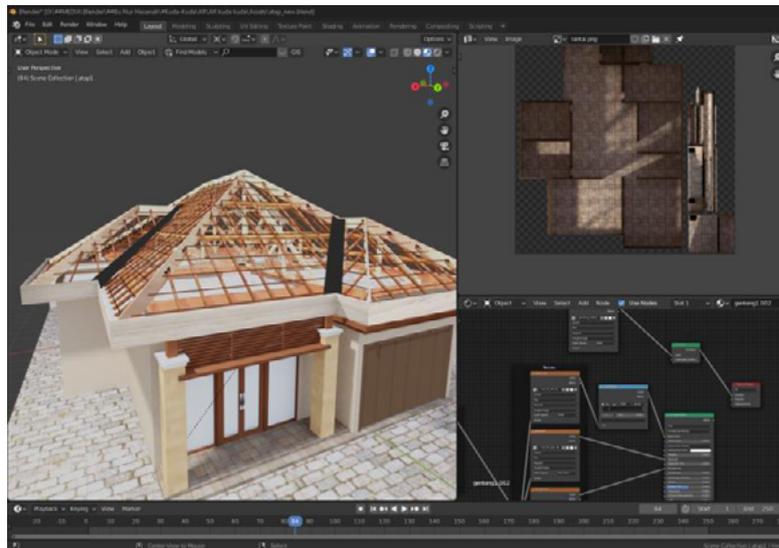


Figure 4. AR construction 3D roof frame objects

Alternative digital learning in the era of the covid-19 pandemic in Indonesia, especially in vocational education, in the field of civil engineering at Yogyakarta State University is through the use of augmented reality. This can be explained through the resources owned by students in general are smartphones, so this is more practical to use. Other digital media are still very possible, but based on the results of interviews and identification, there are still many need for additional tools.

In addition, based on the results of the interview, it can be explained that the use of digital augmented reality learning alternatives is very suitable for introductory theory before practice. This is because students can learn the material first through an augmented reality barcode scan and can be simulated independently before the actual learning activity is carried out. In addition, the use of digital augmented reality learning alternatives makes it easier for lecturers and students to try out problems based on current learning materials.



Figure 5. AR Application Detail Construction of Wooden Roofs

Based on the results of tabulation and analysis, it can be explained that the average perception of the ease of using augmented reality media in learning the construction of wooden roofs is 93%. This perception of difficulty was obtained based on the questionnaire filling of 104 respondents in installing augmented reality application media, using augmented reality applications, understanding augmented reality operations, making it easier to capture information obtained using the help of augmented reality media.

In addition, the application of augmented reality media in the review of the construction of wooden roofs for the usability aspect obtained a value of 4.67 (high), the easy of use aspect obtained a value of 4.608 (high), the easy of learning aspect obtained a value of 4.745 (high), the satisfaction aspect obtained a value of 4.718 (high), and the ease of cognitive skills aspect which obtained a value of 4.758 (high). Although obtained in the high category, especially in the aspect of easy cognitive skills, in fact, when compared to face-to-face learning, it cannot be compared with the need for further research. The following is the distribution of the scores for each aspect based on the use of augmented reality media applications in a review of wooden roof construction.

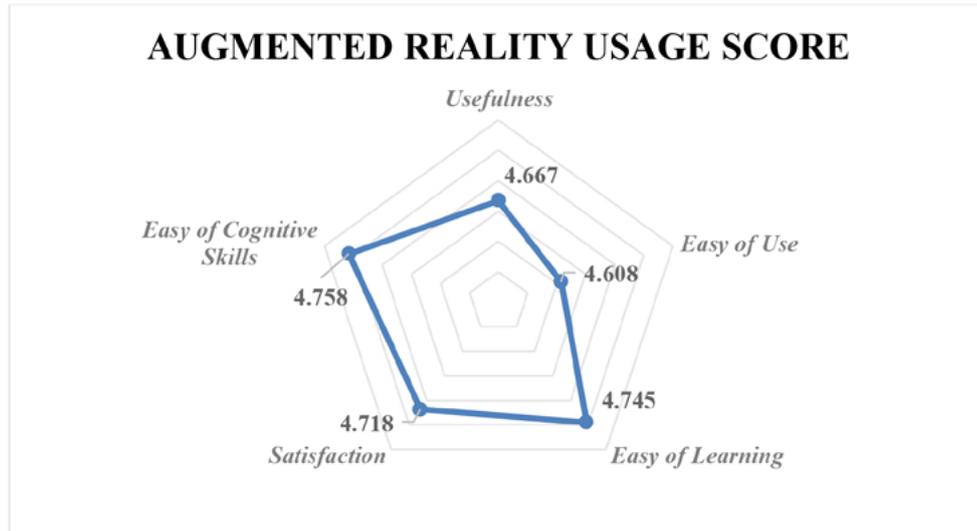


Figure 6. Distribution of AR Usage Score

Based on the distribution of scores above, it can be explained that aspects of the usefulness review include the usefulness of the augmented reality construction of wooden roofs application while deepening the material presented and the suitability of the material to the images displayed as well as the ease of use during online learning during the covid-19 pandemic. Aspects of the easy of use review include the practicality of the augmented reality construction of wooden roofs application during learning, the instructions provided, as well as the steps for using the application that are easy to understand and not difficult. Aspects of the easy of learning review include being easy to remember the steps involved in independent learning, increasing knowledge independently, and adding skills when used in conjunction with practice. Aspects of the satisfaction review include increasing curiosity and motivation in using the application, very suitable to be used as a teaching aid, comfortable when used and there are no errors in use. Aspects of the review of easy of cognitive skills include the ease of identifying various kinds of connections, easy to distinguish the types of connections, easy to make drawings, and easy to calculate material requirements.

## CONCLUSION

The results of the study on vocational learning are 1) alternative digital learning in the pandemic era using augmented reality media; 2) the average perception of the ease of use of augmented reality in learning the construction of wooden roofs is 93%; 3) student readiness in applying augmented reality to the review of wooden roof construction for aspects of usefulness of 4.67 (high), easy of use of 4.608 (high), easy of learning of 4.745 (high), satisfaction of 4.718 (high), and easy of cognitive skills of 4.758 (high).

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