

# PREPARATION OF VOCATIONAL COLLEGE GRADUATES AS SKILLED WORKFORCE IN THE LOCAL CONSTRUCTION INDUSTRY

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## ***ABSTRACT***

*Construction industry is growing rapidly along with the development of a country. This situation caused a high demand of workforce in this industry until the hiring of foreign workers becomes a necessity, as seen in Malaysia's scenario. To overcome this issue, the government of Malaysia established many Technical and Vocational Education and Training (TVET) institutes that have potential to produce local workforce as highly skilled workers in construction industry. However, the preparation of these institutes for their students have never been analyzed, as the involvement of students from TVET institutes in local construction industry as skilled workers is still low, making their preparation method as an issue. Therefore, this research will identify the types of preparation method by TVET institutes for students pursuing programmes related to construction industry, and to assess teaching strategies for programmes related to construction industry to improve student preparation to become skilled workforce. To achieve the main objectives of this research, data collection is performed by interviewing teachers from three Vocational Colleges (VC) namely VC Kluang, VC Klang and VC Taiping, which are teaching Construction Technology programmes. It can be concluded that VCs have adequate preparation to produce graduates that can become skilled workforce in the construction industry. The results conclude that there are two types of preparation method made by the VCs; preparation method in the classroom and preparation method outside the classroom. The classroom preparation method includes laboratory training and teaching using modules designed to fit industrial needs. The results from outside classroom preparation include extra-curricular activities and construction site visits. As for results of the second objective, the teaching strategies to improve student preparation for skilled workforce is through the emphasis of safety during construction to students and the raising of student interest in Construction Technology programmes through industry participation. However, actions need to be taken in order to solve the issues that include a lack of equipment and no large area for computers. This study can help VCs to enhance the student preparedness to work in the construction industry.*

***Keywords:*** *Construction industry, skilled worker, college preparation, vocational college teacher*

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## 1. INTRODUCTION

Construction industry is one of the important sectors in Malaysia. However, this industry is facing shortage of local workers. This issue could be caused by the 3D factors mindset; 'Dirty, Difficult and Dangerous', where local workers perceive that working at a construction site is unsafe and may directly contribute to their deaths (Bakhri, 2008). In order to increase the safety in construction sites and hence curbing the issue of local workers shortage, the government is increasing the establishment of institutes specifically institutes for technical and vocational education and training (TVET). TVET is an important element in developing countries primarily in an industrial country like Malaysia (Abu Bakar, 2003).

To meet the need of the Malaysian workforce, training centres were established starting with 86 training centres of technical and vocational schools initially established by the Malaysia's Ministry of Education (Bakhri, 2008) to more than 287 training centres by 2012. These training centres are established to produce graduates who have the skills and expertise of the skilled workforce in industries, including the construction industry. Despite the increasing number of TVET institutes and centres in Malaysia, the country is still suffering from the lack of local workers in the construction industry, even though the production of graduates is high annually. According to the Department of Human Resources in 2012, the percentage of vacancies in the construction industry was 19.3 percent. As part of the Malaysian economic plan, technical schools under the Ministry of Education were upgraded to become vocational colleges (VC) making them one the largest groups of TVET institutes for training skilled workforce. The vocational college curriculum is designed to equip students with the necessary skills to serve needs of local industries, including the construction industry (Biden and Kamin, 2013). VC award Diploma certificate that are recognised by industries as the certificates are certified by many local and international established agencies. The certifying agencies include the Malaysia Qualification Agency (MQA), City and Guilds of London in the United Kingdom, Malaysian Department of Skills Development, Malaysian Ministry of Human Resource Construction Industry Development Board (CIDB) and The Welding Institute (TWI).

However, the involvement of students from TVET institutes, including from VCs in local construction industry as highly skilled and semi-skilled worker is still low. As part of their efforts to enhance the readiness of VC graduates for the construction industry, all VCs require that their students register and get their Green Card under the CIDB when they reach the age of 16. The registration for Green Card is important in ensuring the safety of personnel at construction sites and no one can enter any construction site without having a valid Green Card with them. The fact that the construction industry is still recruiting a large number of foreign workers indicates that adequate number of locals is still not entering the construction industry.

On previous note, the documents of Ninth Malaysia Plan in 2006 has shown an increase in output of human resources for skilled and semi-skilled workers from public and private training institutes from 2000 to 2005 at an average rate of 13.2 percent and 12.1 percent per year (Mohamed Salleh, 2008). However, currently it shows that high recruitment of foreign workers is causing the exclusion of the local worker in construction industry, especially the local workers who have technical and vocational certificates. The lack of involvement of TVET graduates in the construction industry raises questions on the preparation of their graduates, if in

fact students from these vocational and technical institutes have the required skills and techniques to serve in the construction industry.

Therefore, the objectives of this research are to identify the methods of preparation made by the TVET institutes for students pursuing programmes related to the construction industry, and to assess the teaching strategies to improve student's preparedness to work in the construction industry as skilled workers. The research focuses on the Construction Technology programmes, offered by three VCs namely, VC of Kluang, Klang and Taiping. This study was conducted by interviewing teachers in Construction Technology programmes. The findings from study are expected to assist VCs in enhancing their students' preparedness to work environment in the construction industry.

## **2. TVET SYSTEM IN MALAYSIA**

TVET has been incorporated into the national education system through two stages, namely the Basic Vocational Education (PAV) courses in the lower secondary schools and the Vocational College (VC). The Ministry of Education has been performing vocational education transformation which the main goal is to produce highly skilled human capital with the potential to generate high income as targeted in Vision 2020. Therefore, TVET needs to provide quality energy sources that meet the requirement of the local industries. Nevertheless, the current number of TVET graduates in construction industry is not equivalent to the targeted amount of local skilled workforce in the industry (Abdullah Zawawi, 2011).

TVET is the most important aspect of education in the 21st century in producing human labour that meet the needs of the job market in the industry. It has become an important element of education programmes in addition to academic education in many countries including Germany, Finland and Austria, although there are variations in terms of facilities and methods of implementation. The continuous development of the vocational training program has also becoming an important agenda in many Asian countries. Brunei proves that TVET can provide a quality workforce and meet the needs of technology and the needs of the current economy (Pg Haji Ahmad, 2014). Therefore, TVET has been seen as a cure to the shortage of local skilled workers in Malaysia's industrial employment (Mohamed Salleh, 2008).

In Malaysia, Vocational Secondary School has been upgraded to Vocational College with the approval of the Minister of Education. The Lower Secondary Evaluation (PMR) school leavers were given the option to continue their studies in common schools that have MPV for two years or to follow the flow of technical and vocational stream in secondary technical school and vocational school that offer MPAV for two years. SPM school leavers from the academic and TVET are able to continue to higher level of education (Abdullah Zawawi, 2011). In addition, Deputy Prime Minister also said that the two-sided cooperation between the Education Ministry and the Malaysian Technical University Network will be established to ensure articulation of VC graduates to pursue to a higher education level (Parzi, 2013). Technical and Vocational Education System will be formed to shape the flow of individuals who have high technical skills according to the latest industry requirements (Biden & Kamin, 2013). In this way, local skilled workers will be given a priority in the key industrial state formation (Kamro,

2012). The programmes offered include Malaysian Vocational Skills Training Programme (SKM) and Apprenticeship Program or Mode (SLDN).

In line with the concept of lifetime education, the system of TVET is recognized or known as a system where its role is to equip individual with high technical skill as required by the industry nowadays (Biden & Kamin, 2013, Manap, 2012). Construction Technology Programme is a programme offered at the Vocational College in accordance with the requirements of the Technical and Vocational Education and Training (TVET). VCs have low emphasis on theory in which consists of 30% from the total programme. They provided preparation for the students either in classroom through Learning and Teaching (P & P) scheme or through studies outside of the classroom. The programme was offered to student during the four-year duration of which this programme includes 32 modules incorporating related techniques in construction industry (Syed Ali, 2014). Some of the programmes include education in concrete and brick technology (as research such as in (Manap, 2016a, Manap, 2016b, Manap, 2016c and Sandirasegaran, 2016)). According to the Strategic Plan prepared by the Ministry of Education in 2011, there are five strategies and five initiatives provided (Table 1).

**Table 1: Transforming strategies and initiatives**

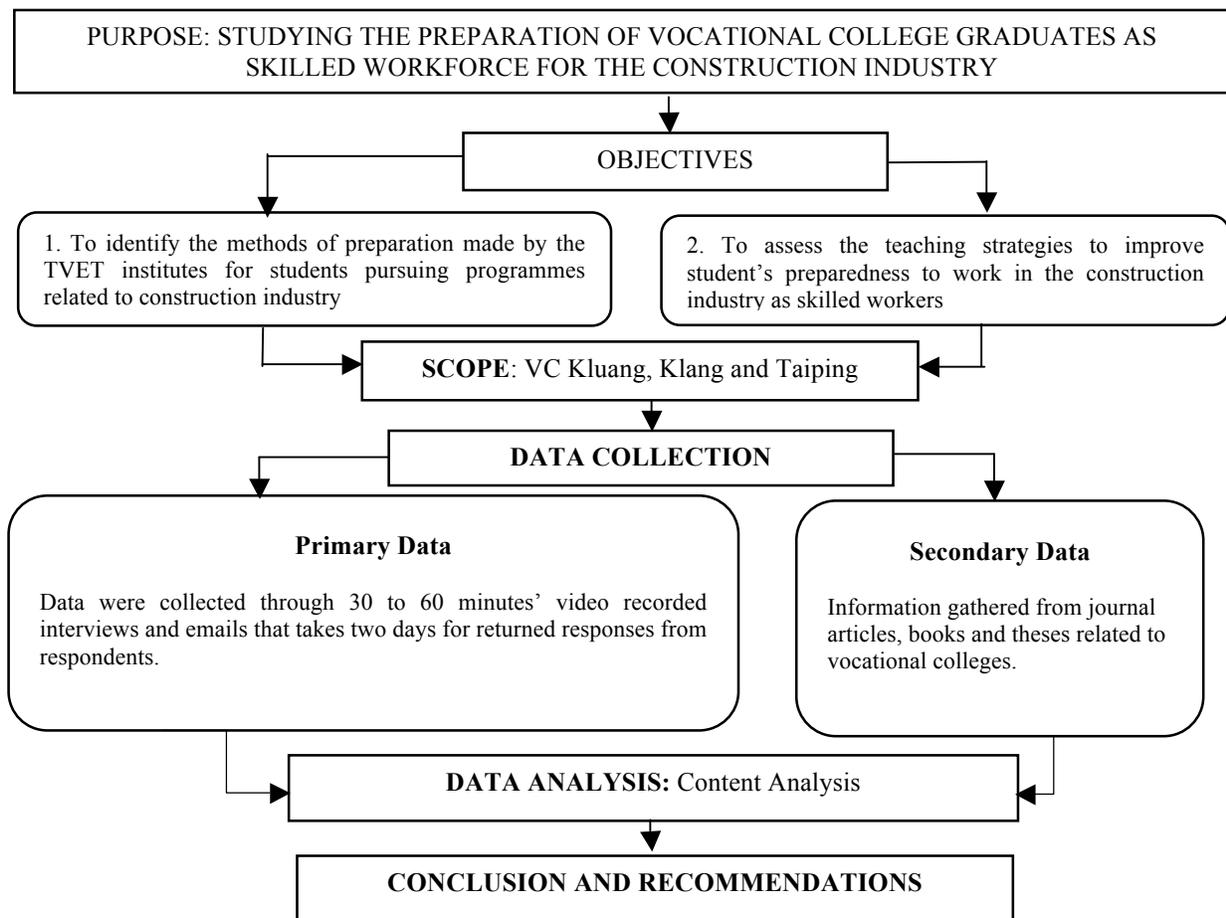
	<b>Strategies</b>	<b>Initiatives</b>
1	Providing vocational education curriculum that can produce skilled human capital to work and willing to pursue higher level	Vocational education curriculum transformation
2	Developing vocational education institutions that can produce skilled human capital to work and willing to pursue higher level	Vocational education institution transformation
3	Intensifying efforts to collaborate with strategic partners in the industry to expand access and ensure the quality of vocational education and improve the workability (employability) of graduates of vocational education.	Collaborate with industry
4	Provide assessment mechanisms that lead to accreditation and recognition of vocational education graduates.	Transformation of education evaluation vocational
5	Strengths to enhance vocational education organization under the Ministry of Education Malaysia.	Transformation of educational organizations Vocational

### 3. METHODOLOGY

The flow of this research is as presented in Figure 1. Qualitative method was chosen to perform the study in where the primary data was obtained through semi-structured interview sessions and email. The population to be targeted in this study consisted of teachers from Vocational College Kluang, Klang and Taiping where the sample includes the teachers of the Construction Technology programme. The data obtained was collected and analyzed to obtain valid results for the problem studied. The results of interviews and emails obtained were analyzed using Microsoft Word 2007, following the nature of Content Analysis. After the data were analyzed,

the results were used to formulate conclusions as to ensure that the objectives are achieved. Data were collected through 30 minutes up to 60 minutes' video recording during the interview, while for the email method takes two days to get feedback from the teacher of VC Kluang.

Each of the answers given by respondents was recorded to ensure that no information is left behind. Data collection was conducted through video recording so that information obtained during the interview is accurate and brief notes will be taken so that no information is missed during the interviews conducted. The process of interviews conducted for a period of 30 minutes to 60 minutes. Face-to-face interviews were conducted with respondents consisting of instructor from Construction Technology programmes at Vocational College Vocational College Taiping and Klang. Meanwhile, email interviews were conducted on respondents from Kluang Vocational College due to time constraint.



**Figure 1: Research flow**

## 4. RESULTS

### 4.1 Demography

The demographic information is important to ensure that the selected respondent can answer the questions correctly and suitable according to the scope of study. Respondents were selected from among teachers in different Vocational Colleges. Based on Table 2 below, it shows the background of the respondents who were involved in the interviews related to the study of potential graduates from vocational colleges as skilled workers in the construction industry.

**Table 2: Demography**

No	Item	Respondent 1	Respondent 2	Respondent 3
1	Programme taught	Construction technology	Construction technology	Construction technology
2	Position	Unit leader	Teacher	Teacher
3	Teaching experience	17 year	17 year	21 year

### 4.2 Preparation methods used by vocational colleges

The first objective is to study the methods of preparation by the VCs for students pursuing the Construction Technology programme. In this research, preparation is defined as the action to provide knowledge and skills to the students. Table 3 shows the feedback from all respondents and it was found that the methods of preparation to gain knowledge and skills are through the preparation in classroom and outside of the classroom.

The first preparation method is through knowledge and skills gained in the classroom. This method includes two different aspects of preparation by the VCs in order to provide students with knowledge and skills. It includes preparation through laboratory training, and preparation through quality module that is designed according to the needs of the industry. Majority of respondents stated that their students acquire knowledge and training on Construction Technology programme through classroom learning and teaching, which includes theoretical and practical knowledge. Additionally, the respondents stated that the modules taught in the classroom is to meet the industrial needs and is according to current development of the construction industry. It was found that the project management module is the most critical and important to students for the Construction Technology programme in all related VCs.

However, all of the respondents support the statement that the project management module is the most critical module because there are constraints in its implementation. This comes from the issues that include a lack of equipment and no large area for computers. All respondents agreed that the industry was involved when modules were designed and the module is designed in accordance with the prescribed syllabus. According to them, during the formation of modules, a meeting will be held in Kuala Lumpur and the TVET committee will invite teachers from Construction Technology programmes from vocational colleges and polytechnics

to design the module. During the design of modules, the industry was also engaged. Respondents also noted that the modules are designed according to the industry's needs in order to facilitate the vocational college graduates to work in the industry. In addition, the involvement of the industry can help students to be exposed to real conditions in the construction industry.

The second preparation method is through knowledge and skills gained outside of the classroom. This can be seen from the preparation of VC by using the example-driven module, the industrial-based student programme like construction site visits, and the extra-curricular activities and student clubs. According to a respondent, the student of this programme is active in co-curricular activities, especially sports.

**Table 3: Summary on preparation methods**

	Item	Respondent 1	Respondent 2	Respondent 3
<b>PREPARATION IN CLASSROOM</b>	Type of delivery	Learning and teaching module	Learning and teaching module	Learning and teaching module
	Module and industrial requirement	Fulfilled	Fulfilled	Fulfilled
	Critical module	Project management	Project management	Project management
	Module design	-	-	By relevant parties
	Industrial involvement during module improvement	-	Involved	Involved
<b>PREPARATION OUTSIDE CLASSROOM</b>	Module design	By Technical and Vocational Education Unit	By Technical and Vocational Education Unit	By Technical and Vocational Education Unit
	Types of program between students and industry	Production Based Education	Project	Programmes with CIDB and ABM
	Industrial involvement	Involved	Involved	Involved
	Co-curriculum activities	Compulsory	Less activities	Compulsory
	Construction site engagement	On job training	On job training	On job training

### 4.3 Teaching strategies used by the vocational college teachers

The second objective is to assess the teaching strategies used by VC teachers to improve student's preparedness to work in the construction industry as skilled workers.

The results as seen in Table 4 show that there are varieties of teaching strategies applied by the VC teachers to produce quality graduates and hence skilled workforce for the construction industry. This includes the emphasis on safety at construction sites and raising student's interest on construction related work through participation of the industry. Majority of respondents stated that the requirement to get the Green Card is a good strategy to convey to students that with proper care, the condition at the construction sites is safe. Moreover, through the Occupational, Safety and Health module, much information on Worker Health and Safety has been disseminated to students. Another teaching strategy used is to emphasise the need for

students to implement safety practices during their laboratory work and while executing their practical tasks.

Respondents also reported that multiple strategies have been implemented to raise student's interest to work in the construction industry. One such example is the invitation to the construction industry personnel to give talk and share their work experiences with VC students. Sharing of experiences through these talks by former VC students who are successfully employed in the construction industry is also found to be a good strategy. Respondents have also reported on the good relationships that have been established between VCs and the Malaysian Construction Academy (ABM), through which student will take an examination to be accredited by the ABM. In the examination, students will be exposed to new technologies through videos of a construction site. Upon completion of the video, the student will be given an examination to test their newly acquired knowledge. In addition, programme such as Vocational College Open Day and International Construction Week have been held with the participations of the students from Construction Technology programme from VCs nationwide. During these programmes, the industrial partners were invited to give talks and to share their experiences with students to open their eyes to the advantages of working in the construction industry. The Product Base Education is also a teaching strategy applied by the VCs, in which students are required to design a product or service based on the knowledge and skills acquired to date.

**Table 4: Summary on teaching strategies**

<b>Item</b>	<b>Respondent 1</b>	<b>Respondent 2</b>	<b>Respondent 3</b>
Strategy to increase safety awareness	Through classroom and laboratory sessions	Green card	Green card
Strategy to increase awareness towards Construction Technology programme	Industrial exposure	Industrial exposure	Involvement with alumni and contractors
Strategy to prepare quality and skilled students	Industrial exposure	Industrial exposure	CIDB involvement
Strategy to develop competent students	Through technical and soft skills training	Through technical and soft skills training	Through involvement of CIDB, ABM and G7 contractors

## 5. DISCUSSION

This study was performed in connection with the potential of vocational college graduates as skilled workforce in the construction industry. The study involved three teachers teaching the Construction Technology programme at VC Kluang, VC Klang and VC Taiping. The first and

second objectives of this study have been achieved using the method of interviews and emails to the teachers of the Construction Technology programme.

For the first objective, it was found that there are two preparation methods to provide the students of Construction Technology programme with the knowledge and skills; preparation in the classroom and outside of the classroom. The results are in line with studies by Nurazimah & Eric (2013) stating that the Learning and Teaching of VC is in accordance with the concept of lifelong education. The studies also stated that the system of Technical and Vocational Education is recognized as a system with its objective is to establish individuals who have high technical skills as required by the industries. The skills possessed by students of VC indeed have been recognized by the industry therefore, graduates of VC for Construction Technology programme can easily be accepted to work in the construction industry.

In preparation for the classroom, majority of respondents agreed stating that their delivery of Construction Technology programmes is through the Learning and Teaching modules, by which students were exposed by instructors to related contents through learning modules in class. The modules being taught for Construction Technology programmes are meeting the demands of industry and this fact is supported by all three respondents. Modules are taught relating to building construction including information on building materials, tiles arrangement, AutoCAD and many more.

The learning module of Construction Technology programme was designed with the involvement of several parties. According to all respondents, during the formation of the module, a meeting will be held which Technical and Vocational Education Unit will invite teachers of Construction Technology programmes in vocational colleges, together with related partners in industry, polytechnics and universities to design the module. The module is conducted in accordance with the prescribed syllabus.

In addition, the module that is considered the most critical and important to students in the construction industry is Project Management module. However, it has been found that they are facing issues that include a lack of equipment and no large area for computers that affecting the implementation of project management module. Additionally, according to respondents also, students are required to make construction-related projects in groups. However, the limitations faced by them are inadequate facilities and equipment. Equipment such as excavators cannot be allocated to the Vocational College. In addition, to implement the project was also a problem for the instructor as it requires a large area to conduct the projects involving excavation. Therefore, this study recommends of having adequate facilities and equipment to be installed in all VCs to ensure that their students are all equipped and have proper skills to work in construction industry.

For preparation outside of classroom, all respondents have stated that the modules outside the classroom is in accordance with the provisions of the Technical and Vocational Education Division. Students are also involved in the programmes of the Malaysian Construction Academy and the International Construction Week held annually in Kuala Lumpur. During these programmes, the industry is involved in giving talks to the students coming from the construction related areas.

According to the respondents, there are extra-curricular activities and extra-curricular clubs related to construction industry being provided to students like CIDB Construction Technology Club. G7 contractors are also involved in college activities which these contractors have been assigned as foster parents to the students. Students are also involved in the On the Job Training where students will go to construction sites and carry out training for a period of 3 months. However, it should be noted for future reference and suggestion, most respondents agreed that site visits should be arranged frequently. This is to give students real experience in the construction industry.

The second objective is achieved using the same method that is based on interviews and email carried on the same respondents. It was found that there are varieties of teacher strategies imposed on the students for Construction Technology programme in order to increase the student preparedness as a skilled workforce. Teachers have taken initiatives to ensure the safety of students during training at industrial construction sites. Moreover, armed with the knowledge that is taught in the classroom, student is also taught knowledge related to the Worker Health and Safety which been taught in the laboratory-based training. In addition, teaching strategies can be seen from many aspects such as conveying safety information and raising student interest through industrial participation. This is in order to develop students to become as a skilled and quality workforce that can compete with graduates from other institutions.

The results are in line with the Strategic Plan by the Ministry of Education in transforming the curriculum, producing skilled human capital to work and move on to a higher level, collaborating with industry, providing a mechanism leading to accreditation and recognition of education of vocational graduates and enhancing the organization's efforts. Various plans, strategies and initiatives by the Ministry of Education have been provided to students of technical and vocational education to produce skilled manpower. The transformation has been carried out to improve technical and vocational education in vocational colleges produce students as skilled workers in the industry.

It was found that a variety of strategies which have been carried out by the instructor for the programme in construction technology will produce a skilled workforce. According to the respondents, various strategies have been taken to protect the safety of students. For example, when in the laboratory, Worker Health and Safety policy was applied to the students which they need to wear a proper attire and safety gear to protect themselves. Students are also required to have a Green Card at the age of 16 years. This is because they will undergo the On Job Training at the end of their programmes therefore, students are required to have a Green Card to ensure their safety.

In addition, educators have made a variety of strategies to foster student interest in the field of construction. Contractors and former students have been invited to share their experience of working in industries and attract students to work in this industry. Additionally, according to one respondent, he stated that efforts were made such as the students are mandatory to take the Accreditation Assessment Test by Malaysia Construction Academy (ABM). This is to give the student a certificate of ABM which has been recognized by the industry.

## 6. CONCLUSIONS

The findings from interviews and emails indicate that VCs have provided adequate trainings to prepare graduates who can contribute to the skilled workforce in the construction industry. Preparation methods for students pursuing the Construction Technology programme include both in class and outside of class activities. Involved teachers use multiple approaches and strategies to improve student readiness to participate as skilled workforce. The teaching strategies range from conveying safety information to raising students' interest through industrial participations. However, actions need to be taken in order to address the issues related to lack of facilities such as the insufficient number of equipment and the lack of space for group projects. Although findings from this study are based on an evaluation of the Construction Technology programmes, TVET programmes of similar nature can also benefit from it, in particular on the elements that need to be considered in implementing programmes towards work ready TVET graduates.

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