THE DEVELOPMENT OF AN ASSESSMENT FRAMEWORK FOR VOCATIONAL EDUCATION TRAINING PROGRAMMES IN THE NOSS BASED TRAINING SYSTEM (NBTS) AND THE NATIONAL DUAL TRAINING SYSTEM (NDTS)

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ABSTRAK

Terdapat dua sistem latihan kemahiran di Malaysia, iaitu Sistem Latihan Berasaskan NOSS (NBTS) dan Sistem Latihan Dual Nasional (SLDN). Walaupun kedua-dua sistem mempunyai pendekatan latihan dan penilaian yang berbeza, sistem ini menghasilkan pekerja mahir negara dengan pensijilan yang sama iaitu Sijil Kemahiran Malaysia (MSC). Bagi mengurus dan memantau kedua-dua sistem serentak, sistem penilaian yang seragam perlu bagi memastikan latihan yang diberikan adalah cekap dan berkesan dalam menghasilkan k-pekerja yang cekap dan mempunyai kebolehkerjaan yang tinggi. Oleh itu objektif kajian ini adalah untuk membangunkan satu kerangka penilaian yang komprehensif untuk kedua-dua sistem latihan kemahiran sebagai panduan kepada personel yang terlibat dalam menjalankan latihan kemahiran. Kajian ini menggunakan pendekatan kaedah gabungan. Kaji selidik, temubual berstruktur dan jadual pemetaan daripada analisis dokumen adalah instrumen untuk mengumpul maklumat mengenai dimensi penilaian daripada sampel seramai 269 personel dari pusat bertauliah dan agensi-agensi yang menjalankan latihan samada menggunakan pendekatan SLDN dan atau pendekatan NBTS. Beberapa teknik statistik digunakan untuk menganalisis data: statistik deskriptif (kekerapan, min, sisihan piawai dan peratus) digunakan untuk menjelaskan responden profil; Penerokaan Analisis Factor (EFA) telah digunakan untuk menentukan dimensi kerangka penilaian dan ini disahkan oleh Parallel Analisis (PA) dan Minimum Sederhana Separa (MAP); deskriptif EFA telah digunakan untuk membangunkan model rangka kerja penilaian dan model ini telah disahkan oleh Structural Equation Modeling (SEM). Terdapat tiga hasil daripada kajian. Pertama, kedua-dua sistem dianggap sama walaupun terdapat perbezaan dalam beberapa sub dimensi. Dari penemuan ini, satu kerangka penilaian telah dibangunkan untuk NBTS dan NDTs dengan menyediakan cirian khas untuk dimensi yang berbeza. Kedua, enam dimensi rangka kerja penilaian telah dikenal pasti dan satu kerangka penilaian bagi kedua-dua sistem telah dibangunkan. bagi memastikan kualiti penilaian latihan kemahiran di pusat bertauliah mencapai standard kemahiran antarabangsa.
ABSTRACT

There are two skills training systems in Malaysia, namely NOSS Based Training System (NBTS) and National Dual Training System (NDTS). Although both systems have different training and assessment approaches, both systems produce national skilled workers with the same certification known as the Malaysian Skills Certificate (MSC). In order to manage and monitor both systems concurrently, a standardised assessment system need to be in place to ensure that the training given is efficient and effective in producing competent and employable k-workers. Therefore, the objective of the study was to develop a comprehensive assessment framework for both skill training systems as guidance to those personnel who are involved in conducting skill training. This study used mixed method mode approach and utilised structured interview, questionnaire and mapping table from document analysis as data collection instruments to gather information on the dimension of assessment. The sample of the study constituted 269 personnel from accredited centers and agencies which conduct NDTS or/and NBTS approaches. Several statistical techniques were used to analyse the data: descriptive statistics (frequency, mean, standard deviation and percentage) was used to explain the respondents profile; Exploratory Factor Analysis (EFA) was used to determine the dimension of the assessment framework and this was validated by Parallel Analysis (PA) and the Minimum Average Partial (MAP) test; descriptive from the EFA was used to develop a model of assessment framework and this model was validated by the use of Structural Equation Modeling (SEM). There were three outcomes from the study. Firstly, both systems NBTS and NDTS were considered similar although some of the sub dimensions were not. From this finding, a common assessment framework was developed for NBTS and NDTS approaches with special treatment for the differences. Secondly, six dimensions of assessment framework were identified, and finally an assessment framework for both systems was developed. The developed assessment framework will ensure whether the quality of assessment in the accredited center achieves the international skill standard.
APPRECIATION

I express my sincere appreciation to my thesis supervisor, Associate Professor Wan Azlinda bin Wan Mohamed and Dr Kahirol bin Salleh for guidance and encouragement during this research.

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<td>ADTEC</td>
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<td>ANTA</td>
<td>Australian National Training Authority</td>
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<td>APA</td>
<td>Accreditation of Prior Achievement</td>
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<td>NVQ</td>
<td>National Vocational Qualifications</td>
</tr>
<tr>
<td>NITTCB</td>
<td>National Industrial Training Trade Certificate Board</td>
</tr>
<tr>
<td>NDTS</td>
<td>National Dual Training System</td>
</tr>
<tr>
<td>NVTC</td>
<td>National Vocational Training Council</td>
</tr>
<tr>
<td>OA</td>
<td>Occupational Analysis</td>
</tr>
<tr>
<td>OCWP</td>
<td>Occupational Core Work Process</td>
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<tr>
<td>OE</td>
<td>Occupational Education</td>
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<tr>
<td>PTQF</td>
<td>Philippines Training Qualification Framework</td>
</tr>
<tr>
<td>PVE</td>
<td>Professional and Vocational Education</td>
</tr>
</tbody>
</table>
PC  Performance Certificate
PTQF  Philippines Training Qualification Framework
QCA  Quality and Curriculum Authority
RTO  Registered Training Organization
RPL  Recognition of Prior Learning
SQ  Scottish Quality
SME  Small and Medium Enterprises
SDAC  Skills Development Advisory Committee
SDFC  Skills Development Fund Corporation
SCID  Systematic Curriculum and Instruction Development
SRL  Self Reliance Learning
TVET  Technical and Vocational Education and Training
TVE  Technical-Vocational Education
TE  Technical Education
TAFE  Technical and Further Education
TAC  Technical Advisory Committee
TESDA  Technical Education and Skills Development Authority
UNESCO  United National Educational, Science and Cultural Organization
UniKL  Kuala Lumpur University
UTHM  University Tun Hussein Onn of Malaysia
UTEM  University Technical of Malacca
UMP  University Malaysia Pahang
UniMAP  University Malaysia Perlis
VET  Vocational Education and Training (VET)
VE  Vocational Education
WE  Workforce Education
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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents an overview of Technical and Vocational Education and Training (TVET) in Malaysia and focuses on two approaches of skills training in Malaysia namely; NOSS based Training System (NBTS) and National Dual Training system (NDTS) which are coordinated and monitored by the Department of Skills Development (DSD)). This chapter also describes the problem statement, aim and purpose of the study, research questions, significance of the study, scope, assumption, conceptual and research framework as well as the various operational definitions used in the research.

1.1.1 An Overview of TVET System

TVET is concerned with the acquisition of knowledge and skills for the world of work. Throughout the course of history various terms have been used to describe the elements of the field such as Apprenticeship Training, Vocational Education, Technical Education, Technical-Vocational Education (TVE), Occupational Education (OE), Vocational Education and Training (VET), Professional and Vocational Education (PVE), Career and Technical Education (CTE), Workforce Education (WE) and Workplace Education (WE) are now conceived as comprising of TVET. Several of these terms are commonly used in specific geographic areas in United National Educational, Scientific and Cultural Organisation (UNESCO) countries. The clarification of TVET
that includes its definition, purpose, and the mission are described in the following paragraphs.

TVET is known to embrace the concept of technical education and vocational training. In terms of specific education, it attempts to prepare students for the world of work; Wenrich & Wenrich (1974) described the TVET system as follows:

\[\text{Vocational education can be described as a specific branch of education focused mainly on preparing its students for the world of work that is specialized, family business or simply to upgrade their current skills (pg 16).}\]

In the world of work and workers, the TVET system includes semi-skilled, skilled, high level technicians or industrial supervisors. Besides preparing its students for the world of work, TVET plays an important role in facilitating education and training for individuals to embark on continuous (lifelong) learning (Wenrich & Wenrich, 1974).

Cantor (1989) stated that the TVET system can be defined as education that facilitates learning program most relevant to work and thus focuses on equipping its students with skills that are suitable and according to the requirements of the profession. Corson (1993) further explained that TVET assists individuals to actively understand the world of work that the industry and workplace constantly require.

The United National Educational, Scientific and Cultural Organisation (UNESCO) and International Labour Organisation (ILO) (2002) defined TVET as a research effort in the field of science and technology aimed at providing individuals with practical skills, attitude and understanding towards specific professions as narrated below:

\[\text{...technology research relating to knowledge, skill development, work ethic and practical understanding towards work in the economic and social sectors (pg 7).}\]
Gray and Herr (1998) lent the words Workforce Education TVET system, and offered the following definition:

*Workforce education caters for students at pre graduate level organized by various institutions, corporate bodies, or government organizations whose objective is to provide them (students) better chance at acquiring job opportunities or simply to solve their skills deficiency at workplace.*

(�g. 4)

The above definition literally suggests that TVET does not necessarily deal with only kinetic or psychomotor or hands-on capability, but also caters to wider competency areas that support efficiency and effectiveness at the workplace. Thus, TVET deals with all work domains that prepares individuals to contribute effectively at a workplace (Finch & Crunkilton, 1999; Wenrich & Wenrich, 1974).

According to Evans and Herr (1978), the objectives of TVET are: (1) to cater for the need of work as required by society, (2) to provide work options for its students and (3) to motivate workplace learning among the learners. Thorogood (1992) further added that the objectives of TVET are: (1) to develop the apprentices with the needed work skills that will continue to help and support their life, (2) to assist the apprentices in securing their choice profession by providing them with the skills that are required by the job, (3) to train the skilled workers needed for the development of an industry, (4) to increase the productivity of an economic sector and (5) to upgrade the life quality of the society.

Basically, TVET seeks to attain two missions, the first is to equip individuals with the skill capability to compete in the job market and to foster the economic development and international competitiveness of the nation by catering for the needs of a highly productive and skilled workforce.

From the definitions, objectives and missions of TVET, it can be seen that there are numerous benefits of hands-on training and learning that an individual gets. This is because developing as well as developed countries must have highly skilled human capital in order to cope with the rapid changes of technologies on the global scale. In
addition, the countries can reduce its reliance on external labor population by increasing the number of skilled workers internally/locally.

### 1.1.2 TVET in Malaysia

TVET development in Malaysia started 40 years ago with the establishment of two public institutions in 1964 namely the National Youth Skills Institute (IKBN) Dusun Tua and Industrial Training Institute (ILP) Kuala Lumpur. Currently, more than 500 public TVET institutions provide multiple programmes at all levels of education as shown in Figure 1.1 which shows the chronology of skills training in Malaysia. Continuous promotions of TVET have resulted in an increased intake of students from 113,000 in 2010 to 164,000 in 2013.

![Figure 1.1: Chronology of Skills Training in Malaysia (Sources: Eleven Malaysian Plan (Malaysia, 2015))](image)

In the context of Malaysia’s education and training system, ‘skills training’ has often been used synonymous with ‘vocational training’ or subsumed within the wider notion of ‘vocational education and training (VET)’ (Pang, 2005). It was only recently
that skills training became an increasingly recognisable and distinct component within the education and training system in Malaysia, rather than merely been regarded as part of the VET component. Based on a review of historical developments in the field of VET in Malaysia, it appears that skills training had emerged as a visible and distinct component of Malaysia’s education and training system by the late 1970s.

During the period from the Razak Report of 1956 up to the Cabinet Report of 1979, Othman, (2003) observed that the Malaysian VET system had progressively assumed a distinct structure, which was dominated by three different streams or pathways, distinguishable in terms of producing the country’s workforce, namely: higher education; technical and vocational education; and skills training. One was a pathway that led to higher education (thus, called the ‘academic’ pathway), whilst VET was segregated into two distinct streams namely the technical and vocational education stream, as well as the skills training stream which is the responsibility of the Department of Skills Development (DSD) a department under the Ministry of Human Resource. The skills training stream has two systems of accreditation which are known as NBTS and the NDTS. Both training systems will be described in details later after examining the scenario of involvement and role of the government and industries in Malaysia towards skills training.

In the Tenth Malaysia Plan (10MP), 2011-2015, TVET continues to be considered as critical for supporting the country’s economic development. Four policy guidelines have been put forward to mainstream and elevate access to quality TVET in Malaysia: (a) Improving the perception of TVET and attracting more trainees, through more intensive national media campaign; (b) Upgrading and harmonising TVET curriculum quality in line with industry requirements, by initiatives which include standardising TVET curriculum, recognising the national skills qualification, and establishing a new Malaysian Board of Technologists (MBOT) ; (c) Developing highly effective instructors, including to establish a new Centre for Instructor and Advanced Skills Training (CIAST); and (d) Streamlining the delivery of TVET, including to review the current funding approach of TVET and to undertake performance ratings of TVET institutions (Malaysia, (2010)).
During the 10 MP, mainstreaming and broadening access to quality TVET were undertaken to address industry needs for skilled workers. Measures were also undertaken to improve public perception towards TVET. Transforming TVET is one of the game changers in the Eleventh Plan to meet the demand of industry and contribute towards economic growth in view of globalisation, knowledge economy, technology advancement and global labour mobility. Focus will be given to transform the TVET delivery system and increase its attractiveness as a choice for another education pathway. A MBOT will be established to recognise the professionalism of TVET practitioners that will enable them to demand higher wages. The initiative was continued in the 11MP (Malaysia, 2015) where emphasis is given to the transforming TVET to meet industry demand.

1.1.2.1 Malaysian Qualification Framework (MQF)

Malaysian Qualification Framework (MQF) is an instrument that classifies qualifications based on a set of criteria that is approved nationally and at par with the international practices. It clarifies the earned academic levels, learning outcomes of study areas and credit system based on student academic load. These criteria are accepted and used for all qualifications awarded by the recognised higher education providers. Hence, MQF unites and links all national qualifications. MQF also provides educational pathways in which it links qualifications systematically. MQF has three sectors. They are skills, technical & vocational, and higher education. Lifelong learning is the pathways which enable individuals to progress towards higher education through the transfer of credits and accreditation of prior learning, from the formal, informal and non formal education without taking into account the time and place (MQA Malaysia 2006). All the sectors are bounded with the eight levels as shown in the figure 1.2.

Referring to the MQF qualifications, TVET involves the two sectors which are skills and vocational and training which produce the Skills Certificate, Diploma and Advanced diploma. Skills Certificate for Level 1-3 are conferred as a formal recognised certificate for individuals who have shown capabilities that are acquired or practiced
with competencies to carry out a task or work which usually is in a form of “manual” skills, and being conferred without considering the way the skills were acquired.

<table>
<thead>
<tr>
<th>MQA Level</th>
<th>Skills</th>
<th>Technical and Vocational</th>
<th>Higher Education</th>
<th>Lifelong Learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>Doctoral Degree</td>
<td></td>
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<tr>
<td>7</td>
<td></td>
<td></td>
<td>Master’s Degree</td>
<td></td>
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<tr>
<td>7</td>
<td></td>
<td></td>
<td>Postgraduate Certificate &amp; Diploma</td>
<td>Accreditation for Prior Experiential Learning</td>
</tr>
<tr>
<td>6</td>
<td>Skills Diploma</td>
<td>Diploma</td>
<td>Graduate Certificate and Diploma</td>
<td></td>
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<tr>
<td>5</td>
<td>Skills Advance Diploma</td>
<td>Advance Diploma</td>
<td>Advance Diploma</td>
<td></td>
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<tr>
<td>4</td>
<td>Skills Diploma</td>
<td>Diploma</td>
<td>Diploma</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Skills Certificate 3</td>
<td>Vocational and Technical</td>
<td>Certificate</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Skills Certificate 2</td>
<td>Technical Certificate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Skills Certificate 1</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 1.2: Qualifications in MQF According to Education and Training Sectors (MQA, Malaysia 2006)

The criteria and standards for Skills Certificate are known as National Occupational Skills Standard (NOSS) and it was developed by the National Vocational Training Council (NVTC) which is also known as the Department of Skills Development (DSD) since 2006 under the Ministry of Human Resource. NOSS is a document that outlines the competencies that should be possessed by skilled workers in Malaysia for a specific field and level of occupation. The criteria and Standard for Skills Certificate are being articulated with higher level qualifications to enable holders progress from the level of semi skills, to skilled workers, right up to supervisory, executive and managerial functions.

Diploma in Technical & Vocational and Skills encompasses capabilities and responsibilities that are wide-ranging and will leads to a career path. The programmes align theory with practice/practical knowledge and an emphasis on instilling of values,
ethics and attitudes in order to ensure that the students will be able (a) to use the knowledge, b) to evaluate and make decision, (c) to become confident and entrepreneurial in generating their own career (d) to become responsible as a member of society (e) to possess study skills in adapting the ideas, process and new procedures for career development (f) to acquire team skills, to communicate efficiently and to transmit information, ideas, problems and resolutions effectively to experts and non experts alike.

Advanced Diploma is a specific qualification, which recognizes that an individual has knowledge, practical skills, managerial abilities and more complex responsibilities and is higher than what is expected at the diploma levels in the field of undertaken employment.

1.1.2.2 The TVET Player

TVET has always been a government driven initiative in Malaysia since inception. The Malaysian government, however, expects the momentum will eventually become industry driven. Thus, local industries especially the Small and Medium Enterprises (SMEs) are expected to take very active roles in forming their own lead bodies for every sectors which will serve to formulate and continue innovating standards that will guarantee the pushing of their products and services to reach the quality sought after by the international market. Such scenario will ideally position the government for the role of support and in providing infrastructures, systems and processes that will further facilitate and improve the commercial and business expectations and convenience for Malaysian industry owners. The following paragraphs will discuss TVET activities that were mainly initiated by government Ministries and Agencies.

According to 11 MP (Malaysia, 2015) there are seven ministries that oversee public TVET institutions including the processing of entrance applications, which led to multiple applications and duplication of offers. TVET delivery is fragmented as it is offered by Government ministries and their agencies, universities, state skills development centres and privately owned institutions.
The seven ministries includes the Ministry of Human Resource (MoHR), Ministry of Education (MoE), Ministry of Youth and Sports (MoYS), Ministry of Regional and Rural Development (MoRRD), Ministry of Agriculture and Agro-Based Industry (MoA), Ministry of Works (MoW) and Ministry of Defence (MINDEF). There are 574 public training institutions under these ministeries (DSD, 2015). These institutions continue to offer programmes that were introduced since their establishment and do not specialise based on their niche areas. In addition, there are 813 private institutions registered with the DSD (DSD, 2015) and 12 state skills development centres conducting TVET programmes with varying quality and standards. The Malaysian Technical University Network (MTUN) comprising four public universities, namely Universiti Malaysia Perlis, Universiti Malaysia Pahang, Universiti Teknikal Melaka and Universiti Tun Hussein Onn Malaysia, offers degree qualification for TVET. Universiti Kuala Lumpur (UniKL) and German-Malaysia Institute (GMi) also provide private TVET higher education.

The DSD under the MOHR is responsible for the development of skills standard and the coordination of skills training. In order to coordinate, monitor and standardise the implementation of skill training in Malaysia, public and private skills training institutions were registered as accredited centres under the DSD. As manifested in the 10th Malaysian Economic Plan (Malaysia, 2010), the government had increased the allocated budget for skill training by 27% in 2011, by 33% in 2015 and by 50% in 2020 in order to increase the number of skilled workers in Malaysia. The targets must be achieved for Malaysia to consolidate its position to be highly competitive, and to attain the status of a developed nation. Thus, the Malaysian government has to continue allocating the necessary funds to cater for the skill training needs in the form of facilities and teaching faculties that will blend with the national skills training scheme to develop highly skilled workforce that is capable of competing with other forces in the global arena. TVET is offered as an alternative route for Malaysian students upon completion of their Malaysian Certificate of Education (MCE), while the majority traditionally choose to pursue their academic stream. Annually about 500,000 MCE students will compete for their places in the academic stream from the universities. DSD was given
the task to coordinate the TVET activities that are offered to students by various ministries and agencies in the country.

Skills training is not only designed to provide educational alternative for Malaysian students, but equally important to develop the skilled workforce that will cater for the local industry needs. It has become the government’s policy on human capital development to create Malaysian k-workers with quality TVET training that will continually align with the requirement of the local industry in order to produce products and services capable of competing in the global market. Thus, TVET is seen both in the light of providing job capabilities for Malaysian youths, as well as economic well being for the country and the local industry. Again the big task of elevating TVET to this position is very much on DSD’s shoulder. The main agencies that are responsible for producing semi-skilled and skilled workers includes; the Human Resource Department (HRD) under MoHR, Department of Technical Education under MOE and MoYS.

TVET’s role is also shared by the Human Resource Department (HRD) within the same Ministry of Human Resource. HRD focuses in organising and conducting skills training covering Level 1 to 5. There are 33 skills training institutes under the HRD, these includes; the Japan Malaysian Training Institute (JMTI), 8 Advance Technology Centre (ADTEC) and 24 Industrial Training Institutes (ITI).

MOE through its Department of Technical & Vocational Education caters for skill training at level 1 and 2 during form 4 and 5 in the high school. The ministry organises their skills training programs mainly at several technical and vocational schools in the country. However, since 2012 the MOE introduced Vocational Colleges by upgrading technical and vocational schools in order to upgrade training to Diploma level.

The MoYS, is another entity that plays an active role in TVET programs. The ministry sponsors 50 youth skills training centres called the National Youth Skills Institut (IKBN) all over the country. The DSD had also accredited them to organising and conducting 100 skill training programs which includes; marine, hospitality, tailoring, beauty, landscaping, electrical, IT and automotive services. The MoYS developed and trained trainees in these fields at level 3 and 4 respectively.
The MOHR provides funding for skill training activities organised by the accredited centres, through the Skills Development Fund Corporation (SDFC). Referring to the Skill Development Fund Act (Malaysia, 2004), the SDFC provide loans to the trainees who undergo skills training at the public and private institutes.

The government continually expect bigger roles from the industry in the form of sponsorships, supplying training aids and providing workplace training exposure. The industry is also expected to actively involve in the recruitment and selection of potential trainees, conducting workplace training, and eventually providing appropriate job positions for the successful trainees. The cost of training is always expensive especially when sophisticated and current technology machinery is required. Thus, the government always welcome assistance from the industry to allow the trainees the privilege of guided exposure in learning to use such machinery.

Nevertheless, industries always have a special role to play in the development of TVET. Industry owners are instrumental partners in the curriculum development of the skills training programs. Their continuous feedback ensures that the work standards conform with the industry needs, and that follow-up training addresses their skills requirements. After all it is the industry that will end up as the eventual employer for the individuals who graduated from the skill training programs. The DSD has also taken the initiative to form a special committee called the Skills Development Advisory Committee (SDAC) to assist in providing vital information related to required industry standards, giving indication whether or not skill training programs conducted conform with the industry needs, as well give advise on skill areas that are in demand. The committees were set up for almost every sectors of the industry. The DSD is also responsible for identifying job titles and skills requirements. Industry experts are also indispensable as external assessors during the student’s assessment process in various accredited centres.

Thus, with the involvement of all parties, government and industry can elevate skills training in Malaysia. The DSD’s role in monitoring and coordinating the national skill training towards mainstreaming can be utilized in the production of k-workers by 55% in 2020 (Malaysia, 2010). However the percentage is review to 35% as mentioned
Eleven Malaysian Plan (Malaysia, 2015). To achieve this target the two methods of training NBTS and NDTS need to be updated and strengthened. Let us explore in details these skill training systems in terms of methods and approaches.

1.1.3 Skills Training in Malaysia

The skills training system in Malaysia has evolved through time. Originally the skills’ training was regulated by National Industrial Training Trade Certification Board (NITTCB), secondly, by the National Vocational Training Councils (NVTC) from 1989 and now by the DSD from 2006. The main goal of skill training is basically to handle the capacity of the growing number of youths each year, particularly school leavers. Basically Vocational Education and Training (VET) in Malaysia is conducted, monitored and certified by the DSD. The mission is to develop the country’s human capital to the level of k-workers capable of bringing the Malaysian industry to compete successfully at the international market. The NBTS was introduced to respond to the rapid changes of new technology, and promote skills training to higher levels (4 and 5) and consequently upgrade skilled workers to a position of technician and higher (MLVK, 1994). Afterwards, a new approach of training which is industry driven was introduced in 2005 known as the NDTS, and its focus was to facilitate the Malaysian skills training. Therefore, currently the DSD coordinate and monitors these two skill training system concurrently.

1.1.3.1 NOSS based Training System (NBTS)

The accreditation system in this study is referred to as the NBTS. It was adapted based on the British National Vocational Qualification (NVQ) framework. The initiative at the time was to find a more effective framework for skill development for Malaysian workers. The system offers two major elements. 1) The accreditation of training centres including the establishment of the occupational skills standards known as NOSS, and 2) The competency-based training approach (MLVK, 1992, MLVK,
Elements in NBTS are concept, curriculum, training approach which contains learning method and teaching approach, training materials, assessment and certification etc. as shown in figure 1.3.

![Curriculum NOSS](image)

**Figure 1.3: NOSS Based Training System (NBTS) Elements**

**a. Concept**

The NBTS searched for flexible learning and certification of skill training about seventeen years ago. This skill training system is institute-based, where 100% training is conducted in the training centre. Graduates from this system lacks workplace experience and have problems with adapting to the technological environment in the industry when they were employed. To reduce this gap, training centres are expected to collaborate with industry to conduct on-the-job training for the student depending on their levels and programmes.

**b. Standard**

The NITTCB’s main activity is to establish the National Trade Standard (NTS) by determining the quality and type of skills that need to be possessed by skilled workers in
industry in accordance to the current industrial development. A trade standard was used as the basis for curriculum development and trade certification. As technology changes work practices in industry may also change, therefore the NTS is subject to review from time to time in accordance with the technological development that occurs in industries.

In order to fulfil and facilitate the learning process of NTS, the board develops training materials i.e. standardised printed training materials to assist training agencies in implementing their own training programmes especially in skill development. Training materials consist of training syllabus, equipment guide list and training module. Training syllabus consist of instructional topics of subject to be covered in the training in order to attain the level of skill in the trade standards. Equipment guide list contains necessary tools and equipment that have to be provided in any workshop for skill training. This document can be used as a reference by training agencies in planning their workshop facilities.

During the period 1989-1990 no new NTS was developed except for some of the NTS trade that was being reviewed. Since that time, 53 trade of NTS have been developed constituting 9 fields that are Automotive, Building, Woodwork, Electronics, Mechanical, Printing, Dressmaking, Measurement and Inspection and Plan Drawing. In line with the new system the curriculum and standard use also changed from NTS to NOSS. NOSS is develop by using Developing a Curriculum (DACUM) approach. According to MLVK, (2006a) NOSS is defined as a specification of the competencies expected of a skilled worker who is gainfully employed in Malaysia for an occupational area and level and the pathway to achieve the competencies. The characteristics of the NOSS are, it should be develop based on the industrial occupational needs; followed the career structure in the occupational fields and developed by industry expert/practitioner.

DACUM is a process with variant of introspection consisting of examining one’s own thoughts and feelings about a certain area. This approach is used in developing the Malaysian standard, NOSS. This approach utilises some basic ideas associated with introspection. DACUM relies on the experts employed in the occupational area to determine curriculum content and allow them to be guided through a systematic content determination process. DACUM initially was created as a joint effort of the
experimental Project Branch, Canada Department of Manpower and Immigration and General Learning Corporation (Finch 1999). DACUM may be defined as ‘a single sheet skills profile that serves as both a curriculum plan and an evaluation instrument for occupational training programmes (Adams, 1999). However, it has been expanded in scope to encompass course and program development for the first phases of five Systematic Curriculum and Instruction Development (SCID) phases. The other four phases include design, instructional development, training implementation and program evaluation.

The development of DACUM has two stages; the first stage is developing an occupational profile and the second stage is the task analysis (MLVK, 2006e). The development of the DACUM profile involves a committee of ten to twelve experts from a specific field. The function of this committee is to participate in all development activities organised when the members are together. Time spent to complete a DACUM profile generally ranges from two to four days. A coordinator who is an outsider of the committee works with the group to facilitate the development process. The facilitator will guide the group through a series of steps:

- Reviewing a written description of the specific condition;
- Identifying general areas of competence within the occupation;
- Identifying specific skills or behaviors for each general area of competence;
- Structuring the skills into a meaningful learning sequence; and
- Establishing levels of competence for each skill as related to realistic work situations.

The developed DACUM profile may serve as a basis for developing instructional content and materials that focus on the student attainment of specific skills. The instructor may be involved in the development process but the decision ultimately is based on the extent to which they are fully aware of the content in the respective occupation being analysed. The advantages; low development cost because the company releases expert from their duties to assist in this process, the time frame for development is quite short; and finally DACUM can enable curriculum content to be derived up to varying degrees to suit any stage of academic intervention.
The second stage of DACUM development is the task analysis. Task analysis is defined as the process whereby tasks performed by the workers employed in a particular job are identified and verified. The worker’s job consists of duties and tasks he/she actually performed in a large segment out of the total work done, example of duties could be organising and planning, typing, maintaining equipment and tools. On the other hand, task is work activity that forms a significant aspect of a duty. Each task has a definite beginning and ending point and usually consists of four or more distinct steps.

The development of the task analysis involves the committee reviewing the relevant literature, developing the occupational inventory, selecting worker sample, administering the inventory, and analysing the collected information. Firstly, they review the literature to examine the occupational area to determine the extent to which the analysis has already been conducted; secondly they develop a list of potential tasks and equipment associated with the occupational area.

Developing the occupational inventory from the equipment and work lists gleaned from the literature review where duplicate items will be deleted and if required, relevant items will be added. Lists are then incorporated into the inventory that will eventually be completed by incumbent workers. Selecting a worker sample is carried out by using appropriate sampling technique to ensure that the result from the worker sample can be generalised to the population.

Once the inventory is developed and the sample is selected, the data can be gathered from the incumbent workers. In order to generate good responses, it is important to establish contact with persons at the managerial level to solicit the cooperation of their employer. Analysing the collected information; after data have been collected, it is typically processed automatically using computers. This meaningful task is then prepared based on the objectives of the curriculum development as an initiative to preparing students for entry-level employment.
c. Training Approach

NBTS adopted the CBT as a training approach in the introduction of the accreditation system (MLVK, 1993). The CBT approach emphasises what a person can actually do in the workplace as a result of being educated and trained in the training institute (Australia, 2002). It uses the self-paced concept where students are allowed to proceed with new topics at their own speed and time, rather than progressing at the same time as other students undertaking the same study. The CBT is a student centred approach with features such as; i) achieved competencies should be identified, announced, verified and predefined; ii) competency encompasses skills, knowledge and attitude/safety; iii) the method and criteria for assessment should be explained and announced clearly at the beginning of the process; iv) the learning program will be tailored for individual development and assessment would be based on each competency and v) trainees can increase the program intensity based on their capabilities to achieve the targeted predefined levels of competencies. In order to support the student centred approach the training materials such as Learning Guide (LG) needs to be developed and the institute needs to have a resource for references which can be utilized by the students.

d. Training Materials

NOSS is a standard to outline the needed competencies for skill workers in industry, so it might not be suitable for skill training. Therefore, a guideline is needed to explain and complement the standard suited for training. For that purpose, the DSD introduced learning materials which is known as Learning Guide (LG) and Course of Study (CoS). LG is a document outlining the guidance for trainees to follow the learning via various activities (MLVK, 2006g). Meanwhile the CoS is a guide for a trainer to implement learning in the training (MLVK, 2006c). Since 2011 NOSS has upgraded to a new NOSS system which constitutes training materials called Curriculum of Competency Unit (CoCu) (DSD, 2012a).
e. Assessment

Assessment is an important element or process to know whether the student has achieved the performance standard required competency in each module of the programme. The assessment process was changed in line with the enhanced and upgraded roles and function of the DSD as a regulated skills training body in Malaysia. The assessment method began with terminal examination and later was changed to the competency based assessment due to challenges in administration and resources.

During the initial period of the DSD which was formerly known as NITTCB, the method of assessment for student’s competencies was the terminal examination. Terminal examination was the centralised examination for skills training. The examination was conducted twice a year for all occupation across all training providers who conduct the specific courses. Normally the exam was carried out at the end of the programme and certified as ‘Basic’, ‘Intermediate’ and ‘Advance’. The examination was managed and conducted by the NITTCB as the secretariat of skills training. The panel examination was appointed consisting of a chief examiner and three to five examiners from the various public and private agencies for conducting the examination at the Skills Training Institute. The result of the training fully depended on examinations because there was no mark carried from the coursework. Trainees were considered to have failed if they did not pass in both the theory and practical parts of the examination. However, the trainees were allowed to resit only the failed paper in the next examination. Every trainee must pass the basic level before he/she was permitted to take the intermediate level.

According to reports by the Ministry of Labour (previously known as the Ministry of Human Resource) from 1989 to 1990, 35,398 trainees sat for the basic level, 30,046 for the intermediate level and 104 for the advanced level, and results showed that only 48% passed in all the 3 levels. It was discovered that 52% of the trainees who failed were not competent enough or were unable to handle the differing situations, stressed or simply overcame by nervousness. Thus the assessment system was not able to 'capture' their competency accurately. Therefore, after benchmarking and study was
done, a new system was introduced in the assessment process which is called the competency based assessment (CBA).

The CBA is a process of collecting evidence and making judgements on whether the desired competence level has been achieved (Australia, 2002). In Philippines the competency assessment is administered by TESDA through its Accredited Assessment Centres and Assessors in order to assess individuals’ skills, knowledge, attitude and work values relative to a specific competency or standard set by industry (Philiphine, 2004). The assessment was conducted with multiple methods depending on the trade or competency the trainees acquired. The objectives of the assessment are: 1) To fulfill the skills characteristic which are set in the NOSS occupation; 2) To develop responsibility among the assessment personal quality assurance commitment; 3) To develop competitive spirit among the trainees and to strive better results; 4) To develop a competitive and skilled workforce; 5) To establish a transparent, fair, valid and comprehensive assessment system.

In NBTS the assessment is done continuously after the completion of each duty/module. The CBT approach allows the trainee to retest the assessment until trainees were judged competent in the specific competency. The test for each module consists of both theoretical and practical categories. The assessment for the theoretical category engaged trainees with various testing methods, namely written test using multiple choice questions, essay and matching. The practical assessment requires trainees to conduct demonstration orally to reflect understanding in individual or group project work. The entire assessment ought to reflect the accomplishment of the performance standard stated in NOSS. The assessment also requires that it strictly observed that the evidences used in the form of skill, knowledge and understanding, to prove competence must conform with the principle of being valid, reliable and sufficient (MLVK, 2006a). Valid when the evidence is current and owned by the trainee. Reliable when the evidence used is strong enough to support the competence being assessed. Sufficient signifies that the evidence is not an isolated case, but repeated and consistent to support the assessment of the competence. All the evidence is recorded in the portfolio where each trainee needs to develop with the assistance of their instructor.
On 1st June 2006 the assessment system introduced a final examination in addition to the existing assessment (MLVK, 2006b). It was done in response to the complaint that the assessment was not sufficiently effective since trainees who were awarded the MSC level 2 and 3 could not perform their job at the workplace. The Technical Advisory Committee (TAC) which consisted of various experts from the industry required that the final test papers must reflect and fulfill industrial needs. The assessment process is conducted by the assessors, internal verifiers, external verifiers and the accredited centre assessment panel. The role of external verifiers was also increased. Instead of just acting as external verifiers for the continuous assessment, they also function as examiners for the final examinations, and assisted by assessors and internal verifiers at the respective accredited centres.

The competency components to be assessed are different for all levels. At Level 1, 2 and 3 trainees needed to pass 40% of the course work and 60% from final examination of core abilities assessment. At level 4 or Diploma level and level 5 or advanced diploma level, the components consisted of 40% course work, 40% final examination on core abilities, and 20% final project on the job assessment.

f. Certification

Considering the upgrading of assessment system, the grading was changed to excellent competent, competent and not yet competent. Trainees who were excellent competent and competent in all modules were awarded the Malaysian Skills Certificate (MSC) level 1, 2 and 3, level 4 or known as the Malaysia Skills Diploma (MSD) or level 5 known as the Malaysian Skills Advanced Diploma (MSAD) upon completing the training. Whereas those who did not completed the modules were awarded the Performance Certificate (PC) which states the completed duties of the trainee.

NVTC also recognised skilled workers in the industry who were not enrolled in the formal training via the Recognition of Prior Learning (RPL) process. As mentioned in (MLVK, 2006d) the RPL is a process where the NVTC awarded the MSC to skilled workers based on their evidences of prior achievement, such as work experience,
evidence of workplace training, work project and testimonials. The initiative allowed existing skilled workers gain qualifications without going through formal education or training.

1.1.3.2 National Dual Training System (NDTS)

The government of Malaysia decided on 19th May 2004 to implement the NDTS which commenced in 2005. The aim was to produce 31,500 skilled workers by the year 2010 (MLVK, 2005a). The NDTS has evolved from the Dual Training System Project (DSP) which was formulated with the purpose of strengthening technical education and vocational training in Malaysia by incorporating the dual training system practiced in Germany (DSP, 2001). The DSP started with a study known as ‘Basic Study on the Design of a Dual Vocational Training Scheme in Malaysia’, undertaken by German consultants from 1997-1999 (Blumenstein, 1999). Components in the NDTS includes concept, curriculum, training approach which contains learning method and teaching approach, training materials, assessment and certification as shown in figure 1.4.

![Figure 1.4: National DualTraining System (NDTS) Elements](image-url)
a. Concept

NDTS is expected to address skills which are needed in the workplace, and to assist in coping with the increasing complexity and rapid technology changes in the work process. The dual-training concept means that training is conducted in two venues, at industry shop floors and at participating training institutes. The NDTS apprenticeship training system is organised using dual approaches that combine workplace education and vocational training from training institutions. Training at workplace (70%) takes place under dynamic conditions and with machines and facilities according to the standard of technology presently in use. Apprentices were released for a specific period of time to attend TEVT training centres (30%) that provides support and supplement knowledge and skills related to their chosen occupations (MLVK, 2005a).

The NDTS apprenticeship training is based on three basic competencies that are inculcated and developed during the training program, namely: 1) Technical competence (comprises of knowledge and skills in the technical field); 2) Learning and methodological competence (comprises of lifelong learning, problem solving activities when planning, executing and monitoring workplace assignments); and 3) Human and social competence (comprises of social integration when working in teams and development of personalities (MLVK, 2005a). The scheme offers two types of programmes: 1) The day-release programme and 2) The block-release programme. The day-release programme dictates that apprentices are trained at the industry for five days a week and two days at the training institute. The block-release programme enabled the apprentices to undergo training for about five months in industries and about two months at the vocational training institutes (MLVK, 2005a). It was hoped that with 500,000 companies and industries, the government will produce more k-workers in a short term with limited budget.

The NDTS philosophy aims at producing a new type of skilled workforce known as knowledge-workers (k-workers) (Malaysia, 2001c) and to devise a new approach that integrates classroom training with workplace learning which features the industry as the main driver. The purpose of the dual system approach is to develop a workforce that
could adapt to rapid technological and workplace changes, and to nurture creativity, innovativeness and thinking skills among trainees (Malaysia, 2006a). It is a dual system where the training is conducted in institutes and industries. The principles are spelt out in the Third Outline Perspective Plan, 2001-2010 (Malaysia, 2001b) as: to ensure that the school curriculum remains relevant to industry and include work-based learning components, a mechanism will be set up to link schools with industries (Malaysia, 2001a).

b. **Standard**

The National Occupational Core Curriculum (NOCC) is the foundation for the NDTS implementation of training and assessment in industries and training institutes. The NOCC is defined as the documented training structure to be carried out by the industry and the training institution comprising of practical and theoretical knowledge of changing technologies, to produce k-worker (MLVK, 2005a). The curriculum identifies skills and training needed to produce knowledgeable workers. It is a detailed framework, which was developed based on studies and analysis of industrial needs.

NOCC is developed by work process analysis approach. Work process analysis approach was explained through objectives in a scientific orientation in vocational educational sciences and comprises of three objectives. They should help to identify the competencies for the coping and shaping of occupational work tasks; access the most important coherences for competency development; and determine the work process knowledge for the shaping of business and work processes.

The three principles in the work process analysis includes; competencies and the principles of science, competency development and the principles of personality and work process knowledge and situation principle. According to (Pahl, 2005) it can be assumed that competencies can be assessed in a scientific and systematic way. The European Centre for the Development of Vocational Training (CEDEFOP) defines competency as the ability to make use of knowledge, know-how and skills in a familiar
and new coherence manner in which the crucial importance of the context (coherence) and application are already emphasised (CEDEFOP, 2004).

The implication for research methods is that skills themselves have to be surveyed and decoded. As mentioned by Rauner (2004) the vocational educational research is all about the decoding of knowledge and skills incorporated in occupational work, organized in specialized domains. Competency development and the principles of personality: It is a central assumption that competencies develop in the course of dealing with occupational work tasks and problem. Work process analysis contribute to the accessibility of coherence and conditions “which allow for a support of the transition of one development level to another” (Rauner, 1999).

Work process knowledge and situation principle: Work process knowledge creates immediate coherence between the knowledge of corporate work organisation and specialised theoretical knowledge. Transfer activities are not required. It is the acting relevant knowledge of this coherence. It is closely linked to own work experience and knowledge of corporate world, it is means to understand the entire work process which involves the respective person complete with its product related, technical, work organisational, social and system oriented dimension (Kruse, 1986).

c. Training Approach

In terms of training delivery: action-oriented teaching, self-reliant learning (SRL) as well as learn and work assignments (LWA) have been adopted as the fundamental teaching and learning approaches (MLVK, 2005a). According to Ngan, (GMI, 2005) the action-oriented teaching is a way in which human beings set goals and create a plan in their mind before bringing it into various steps of action.

The processes of action-oriented learning approach encompass setting goals, planning the pathway for the action, decision-making regarding utilisation of plan and resources, executing the action process and monitoring and evaluating action and its result (GMI, 2005). SRL is a process for solving learning and work assignments by following the action-oriented approach steps (Hoepfner, 2004) and (Hoepfner, 2003).
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