A CASE STUDY OF TWO PARTICIPATING COMPANIES ON THE IMPACT OF NATIONAL DUAL TRAINING SYSTEM (NDTS) IMPLEMENTATION ON TEACHING STRATEGIES

MOHD FAIZAL BIN TOKERAN

UNIVERSITI TUN HUSSEIN ONN MALAYSIA
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ABSTRACT

The implementation of National Dual Training System (NDTS) in Malaysia requires the new form of teaching strategies which based on work process knowledge. Therefore, the new teaching and learning environment which focuses on work-process-orientation needs to be designed appropriately to meet the ever changing work process in the industry. The main objective of this study is to explore and discover the existing practice of development and application of Learn and Work Assignment (LWA) and other relevant training materials. The study adopted a mixed method of qualitative and quantitative research and the data collection were interviews, document reviews and observations. In order to investigate the real situation, two companies which were involved in transportation industry were selected as a study case. The finding leads to the determination of areas and characteristics of work-process-orientation teaching strategies to be embraced in teaching strategies thus the level of compliances for participating companies can be evaluated. For the development stage, the study found that the work-process-orientation in four areas which are; (i) appropriate use of development methodology, (ii) personnel involved, (iii) description of LWA documentation, and (iv) classification of complexity and difficulty were at high degree of compliance. With respect to the work-process-orientation implementation, three areas have been identified; (i) consideration of didactical approach, (ii) methodology of training, and (iii) role of coach and trainer. The study also discovered that the work-process-orientation on the implementation stage or teaching process achieved a high degree of compliance. The work-process-orientation compliance assessment scheme which was developed and used in this study can be benefited for assessing the extent of work-process-orientation in teaching strategies at the NDTS participating companies.
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<td>CWP</td>
<td>Core Work Process</td>
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<td>DSD</td>
<td>Department of Skills Development</td>
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<td>ETP</td>
<td>Economic Transformation Plan</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>LWA</td>
<td>Learn and Work Assignment</td>
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<td>NDTS</td>
<td>National Dual Training System</td>
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<td>NEM</td>
<td>New Economic Model</td>
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<td>NOSS</td>
<td>National Occupational Skills Standard</td>
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<td>NVTC</td>
<td>National Vocational Training Council</td>
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<td>OA</td>
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CHAPTER ONE

INTRODUCTION

1.1 Overview of chapter

This chapter starts with Malaysian economic scenario and its relation with workforce demand thus leads to the reform of skills training in Malaysia. This chapter also will explain the rationale behind the decision on the implementation of National Dual Training System (NDTS). Researcher then will discuss the background of the study, problem statement, research objectives, research questions, theoretical framework, scope of the study and operational definition. Thesis outline will be highlighted at the end of this chapter.

1.2 The development of Malaysia’s workforce

Malaysian economy has transformed from a country that long depended on agricultural commodities and mining to an industrializing economy where manufacturing and services be a main contributor to the economy accounting for 23.0 per cent and 53.8 per cent of Gross Domestic Product (GDP) respectively for the year 2015 (EPU, 2015a). As Malaysia is moving towards becoming a developed country by the year 2020, it is now moving-up the value chain and is currently focusing on attracting high technology, high value-added, knowledge-based and skills intensive industries, incorporating activities such as design and development and research and development. Therefore, the demand for the workforce structure also has changed, it is a need for acceleration of demand for
skills particularly at the higher levels, technicians and above and a corresponding decline in demand for unskilled or low-skilled production workers and craftsmen as shown in Figure 1.1.

Figure 1.1: Economic labour force for industrializing economy

The government of Malaysia had taken the necessary action to ensure the requirement for skilled worker can be addresses. In order to meet the changes required by the industry and economic scenario, the skills training in Malaysia has reform significantly from its earliest appearance in the form of traditional handicraft training almost 120 years ago, and craft and trade skills training about a century ago (Pang, 2007). It is started in 1897 when the British initiated the training for Malays youths as mechanics and fitters to manage the railway lines in Malaya (Jailani, 2010). Skill training has become more visible and separate component within the Malaysian education and training system only in more recent decades. This is supported especially with the introduction of training based on National Occupational Skill Standards or NOSS in December 1992 (MLVK, 1994; NVTC 2001). The development of NOSS as
well as the Competency-Based-Training Approach which is mainly oriented towards and adaptive qualification and functions are shown in Figure 1.2. The NOSS development is based on job title and currently consists of five (5) level of competency for the purpose of awarding Malaysia Skills Certificate or Sijil Kemahiran Malaysia (SKM) as Table 1.1. The NOSS could be used as a training guide where the training syllabus can be derived from the relevant NOSS. It also could be used in working environment for workers performance evaluation, job modification, job description, career development / planning and basis for wages / compensation.

Figure 1.2: Competency Based Approach for the Development of NOSS

Source: www.dsd.gov.my
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<th>Level</th>
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<tr>
<td>Level 1</td>
<td>Competent in performing a range of varied activities, most of which are routine and predictable.</td>
</tr>
<tr>
<td>Level 2</td>
<td>Competent in performing a significant range of varied work activities, some of the activities are non-routine and required individual responsibility and autonomy.</td>
</tr>
<tr>
<td>Level 3</td>
<td>Competent in performing a broad range of varied work activities, performed in variety of contexts, most of which are complex and non-routine. There is considerable responsibility and autonomy and control or guidance of others is often required.</td>
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<tr>
<td>Level 4 Malaysian Skills Diploma (MSD)</td>
<td>Competent in performing a broad range of complex technical or professional work activities performed in a wide variety of contexts and with a substantial degree of personal responsibility and autonomy. Responsibility for the work of others and allocation of resources is often present.</td>
</tr>
<tr>
<td>Level 5 Malaysian Skills Advance Diploma (MSAD)</td>
<td>Competent in applying range of fundamental principles and complex techniques across a wide and often unpredictable variety of contexts. Very substantial personal autonomy and often significant responsibility for the work of others and for the allocation of substantial resources feature strongly, as do personal accountabilities for analysis and diagnosis, design, planning, execution and evaluation.</td>
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Along the way, two phenomena, drastic technological changes and increasing complexity of work processes in industry has resulted in new requirements of skilled and dexterous workers. Changes in the field of work and technology with unpredictable and undetermined results open a wide spectrum of options how to organize work and
produce and offer numerous goods and service variation (Gerds, 2007). The advancement of new technologies changes the way works are done and brings about a shift of workforce requirement from low skills to workforce being well informed and high skilled (K-Worker). Due to the situation described, the existing training system which focuses on the Competency Based Training (CBT) can no longer cope with these changes. CBT because of its internal logic focuses on ‘work’; but it cannot follow the incorporation of ongoing change in the ‘work-process orientation’ of training which has become mandatory today (Loose, 2008). On top of that, Spottl (2004) found that the challenges of the Malaysian educational system TEVT as follow:

i. High-tech equipment in use needs a highly qualified workforce;  
ii. The management of companies of the Malaysian industry follows the global quality philosophy which requires highly qualified staff;  
iii. Products of high quality need highly qualified staff for the production;  
iv. The Malaysian industry moves very fast towards a quality oriented high-tech production;  
v. The organization of work in industry concentrates more and more on work processes with all the consequences for human resources.

Therefore, it is necessary to lies in the combination of competency-based training and experience-based training (Zaharaton, 2003). Experience-based training, on the other hands, addresses the instructional process. The complementary nature of both approaches seems to suggest that it may be desirable to combine them (Loose and Hakim, 2008). Consequently, the experience based approach underlying workplace training as a major component and competency based training focusing on work-related standards and assessment of achievement through skill testing need to be merged to exploit the full learning potential of a work-process-orientation in training (Loose, 2008). Since the workplace needs to become a major component of the training, thus the private sector is a driving force for the effective implementation of it. This led to yet another major development in the country’s skills delivery system, with the decision of the Government of Malaysia to implement the National Dual Training System (NDTS).
The implementation of 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; Pang, 2007). The NDTS is introduced to produce k-workers under a comprehensive and latest training system to meet the industries prevailing requirements. Thus, the NDTS is expected to minimize the mismatch in term of quality and quantity of skilled workers, closing the technological gap between industry and training institution, minimizing the dependence of foreign workers and also transferring technology to skilled workers and training institutions, as well as the industrial society at large. Due to the importance of developing a holistic k-worker, NDTS programme should encompass not only technical competences but also human and social competences as well as learning and methodology competences.

The NDTS is a training concept of two separate training environments that is 70 to 80 percent at the workplace and remaining 20 to 30 percent at the training institutes. This two separate training environments have clearly defined characteristic educational assignments; training institute is traditionally responsible for theoretical knowledge oriented towards scientific curricula and general educational content, while workplace have to do with work experience and practical expertise (Dehnbostel & Molzberger, 2004). The duality of the structure is also reflected in systematic features such as the role and status of training personnel, the funding regime and the supervision of training processes (Ertl, 2002). The types of training program under the NDTS will be determined by the industries concerned in collaboration with the training institutes, whether it is to be day-release or block-release, convenient to the industries. In the day-release program, trainees are trained at the industry 4-5 days a week and the remaining 1-2 days at the training institutes. In the block release program, trainees undergo training for 4-5 months at the industries and 1-2 months at the training institutes. The training period is about 2 years of four semesters (MLVK, 2005). The training will be conducted through several approaches:

i. Hands-on and knowledge training to be conducted by a coach at the workplace of the company, whereas at the training institute, a trainer will conduct the training
programme to be undertaken by the public or private sector, or the company itself.

ii. Training programme may also be conducted by the company at their premises together with the trainers from any approved training institutes.

The training concept in NDTS was based on work process knowledge. The training concept qualifies people to cope with the demands of modern industrial workplaces and continuous learning must be related to the work process rather than to the technical sciences. The NDTS implementation requires occupational work process related curricula, qualified trainers at training institution and coaches at workplace and new didactic approach. In terms of training delivery, self-reliant learning, action-oriented teaching as well as learn and work assignments have been adopted as the fundamental teaching and learning approaches (MLVK, 2005; Pang, 2007). These requirements can be understood as Boreham (2004) has mentioned that work process knowledge has become the main conceptual tool for curriculum development in vocational education and training. This is because the quality of training relies heavily on the quality of the curricula as the pathway for the trainees to acquire their skills. Fischer and Stuber (1998) also state that work process knowledge must be fundamental part of the vocational and technical curriculum if it is to prepare trainees to adapt to more flexible ways of organising production. The account of work process knowledge above emphasises that training institutes must work in a close coordination with companies to provide an appropriate context for the desired fusion of the two ways of knowing.

Therefore, the development of NDTS curriculum or National Occupational Core Curricula (NOCC) were started in April 2005, organised by the National Vocational Training Council and spearheaded by experts from related industries to cope with the new requirement in training curriculum. NOCC is defined as “the documented training structure to be carried out by the industry and training institute comprising of the practical and theory of the changing technologies, to produce k-worker” (MLVK, 2005). It could be used as the basis to prepare teaching materials and other needs, as standards for levels of achievement and skills quality of the apprentices under NDTS and as
reference for preparation of Learn and Work Assignment (LWA). The development of NOCC was based on work process approach. The major component in NOCC is Occupational Core Work Processes which is commonly practiced in most companies dealing with the same Training Occupation.

For NDTS, the components which didactics is concerned with are related to the work process and the LWA are the core elements in the didactic approach. Therefore, the learning environment for work process related training has to be as similar as possible to the real world of work. Consequentially, it is inevitable to develop and implement LWA and other relevant training material that comply with the requirement of work-process-orientation.

1.3 Background of the study

The introduction of NDTS is to modernize the ‘competency-based’ system which implemented through DACUM based job profiles and occupational standards or called NOSS. The needs for modernization and newly training system is partly due to form and structure of NOSS which describe narrow fields of tasks (duties) and highly fragmented tasks (tasks) which can no longer cope with the ranges of tasks facing skilled workers in modern production and service concepts (Spottl and Becker, 2008). Thus, the NDTS implementation must be geared to produce skilled workers that have the willingness for lifelong learning and be able to work in networks and teams, always anticipating tomorrow’s needs at the workplace (Hoepfner & Koch, 2003). Therefore, all these requirements need to be taken into consideration and should be blended and linked in the teaching strategies. The teaching strategies with regard to the design of work-process-related learning situation and teaching process are the platform where holistic k-worker occupational competences can be planned, integrated and taught to the trainees. The integration and linkage of these components have to be considered during the development and implementation of teaching strategy. It should be planned and implemented by intent, rather than leaving it to chance to happen.

The implementation of NDTS relies on the new curriculum approach that was based on work process knowledge and the application of Learn and Work Assignment (LWA). The use of work process knowledge as the conceptual underpinning for training
represents a paradigm shift, as the ‘turning point for curriculum design’, away from the narrow Tayloristic concept of jobs (Rauner, 2009). Most importantly, the contents of LWA are transformed from the actual work assignments in work processes at the workplace; they complement the newly designed curricula and are suitable to network training institutes and companies in the NDTS in their joint effort of training (Hoepfner & Koch, 2003). This LWA in NDTS curriculum have been used for the companies and training institutes for conducting training in collaboration basis. The transformation from significant work processes to learning situations entails a complex series of steps beginning with analysis of work activity and the required competences, followed by the development of work-process-related and competence-based curricula and ending with the design of work-process-related learning situations.

However, even though the development of the first generation NDTS curriculum and LWA was initiated in April 2004, there is only a handful of literature and reference materials that available to provide necessary information particularly on the specific characteristics of work-process-orientation and how it is going to be embraced in the training material. In addition, Fischer and Bauer (2007) highlight that it is an open question how work activity and the occupational background can be considered, how it can be transformed into curricula and how these curricula can guide the everyday teaching and training in dual system training. The guideline for the development and application of LWA does not provide detail answers to these questions. The presence guideline briefly highlights the outline of the LWA development process mainly on the macro-level aspects and not specifically mentioned the detailed of the requirement for work-process-orientation. Consequently, this situation could led to the different and variant understanding among facilitators, expert workers, coaches and trainers thus potentially would not be able to fulfill training requirements.

1.4 Problem statement

Undoubtedly the NDTS implementation in Malaysia requires work-process-orientation teaching strategies that provide more effective training to produce competence workforce. However, to date there is no empirical study conducted on work-process-orientation teaching strategies for NDTS. This situation has caused uncertainties and
created arguments whether the development and application of LWA and other relevant training material really based on work-process-orientation. Currently, the development and application of LWA was conducted without specific characteristics of work-process-orientation and its requirement to be complied.

The uncertainties and argument was supported by the outcome of the Report on NDTS Series of Dialogue with CEO, which was organized by DSD on 2005 and attended by a total of 1200 companies throughout the country. The company had highlighted their problems of lacking personnel that have skills in training methodology to develop and implement training materials such as Learn and Work Assignment (LWA). In addition to that issue, finding from the study on Work Process Analyses – An Essential Tool for Qualification and Curriculum Research, Re-engineering Dual Training – The Malaysia Experience conducted by Spottl and Becker (2008) revealed that teachers and trainer involved in instructional design in Malaysia lack information on the work processes and work coherences which were not assessed through the procedures of ‘job’ and ‘task analysis and therefore could not be taken into consideration for designing the curricula. Another point in the finding is that the curriculum developers which most of them were ‘DACUM facilitators’ having greatest difficulties on preparing detailed work process descriptions, and identifying the specialized occupational problems and their requirements for the work tasks. DACUM facilitator is a person involved in facilitating NOSS development with precise descriptions of ‘duties’ and ‘tasks’ as well as the relevant lists of content. They often interpreted ‘work process’ as the process of developing a product. Therefore, doubt aroused whether the contents and form of teaching strategies are really in accordance to the requirement of work-process-orientation especially to provide an effective didactical approach for generating work-process-knowledge combined with the generic skills (such as independent and lifelong and social learning, teamwork, independent learning etc.).

Thus, with this constrains and after a thoughtful consideration, the researcher decided that the best solution to those issues is to determine the areas and characteristics of work-process-orientation to be embraced in the development as well as the application of LWA and other relevant training material. It could be conducted through in-depth exploration and discover the related process in teaching strategies for NDTS.
The determined areas and characteristics could also serves as an instrument to assess the extent of compliances for work-process-orientation teaching strategies among NDTS participating companies.

1.5 **Research objectives**

The research aims to explore the work-process-orientation in NDTS teaching strategies pertaining to the development process of LWA and other relevant training materials as well as the implementation of training. The specific objectives were set in order to achieve the aim of this study and outlines as follow:

1. to explore and discover the actual practice of developing and implementing the LWA for NDTS implementation.
2. to determine the areas and characteristics of work-process-orientation for NDTS teaching strategies.
3. to assess the extent of compliances for work-process-orientation in teaching strategies among NDTS participating companies

1.6 **Research questions**

In order to achieve the research objectives, research questions were formulated and outlined as follow:

RO1 : to explore and discover the actual practice of developing and implementing the LWA and other relevant training material for NDTS implementation.

Research Question 1 (RQ1):

*How was the practice of developing and implementing the LWA and other relevant training material for NDTS implementation?*

In addressing this question, the researcher starts off by studying the history of the NDTS from the outset of its establishment in micro-level. It begins with understanding the concept and objective of the NDTS implementation. Then, it will be subsequently followed by investigating the whole process of developing and
implementing the LWA and other relevant training material. Since the scope of the study focuses mainly on the LWA development and the training delivery based on that particular training material, the researcher is bound to do a comprehensive analysis of the development process as well as the implementation process that has been in practice in the country. The data collection focal point is on the existing approach used whereby the work-process-orientation which was derived from work process knowledge has the essential elements in both stages. Work process knowledge is an active knowledge which is directly useful for the performance of working tasks or performance tasks (Boreham, 2004; Rauner, 2005). For the purpose of helping the researcher to obtain in detail the idea and knowledge in specific situation, two NDTS participating companies had been selected as a case study. In terms of data collection, semi-structured in-depth interviews will be the main method besides document review and observation. The findings of the study will finally enable the researcher to track and understand the development and implementation approach of LWA and other relevant training material.

RO2 : to determine the characteristics of work-process-orientation for NDTS teaching strategies.

Research Question 2 (RQ2):

*What are the characteristics of work-process-orientation teaching strategies concerning the development and implementation of LWA and other relevant training material?*

The determination of characteristics for work-process-orientation teaching strategies by and large refers to the in-depth understanding on the concept of work process knowledge and how it is to be integrated in the development as well as the implementation of LWA and other relevant training material. For the NDTS implementation, the concept of occupational profile based on work process was introduced which rely on Core Work Process being performed at the industry (Spottl, 2009). In order to address this question, the researcher puts more attention during the exploration process and find out most significant characteristics to be
applied for both stages. Each characteristics and its respective requirement then
need to be arranged in an appropriate arrangement. In terms of data collection, semi-
structured in-depth interviews also will be the main method besides document
review and observation. The facilitators for LWA development as well as
facilitators for coach and trainer training will be selected to provide the precise
information from their expertise perspective. The findings of the study will finally
enable the researcher to develop work-process-orientation assessment tool.

RO3: to assess the extent of compliances for work-process-orientation in teaching
strategies among NDTS participating companies.

Research Question 3 (RQ3):

*To what extent the participating companies complied with the requirement of
work-process-orientation in their teaching strategies?*

i. To what extent work-process-orientation has been considered in the
development of LWA and other relevant training material?

ii. To what extent work-process-orientation can be detected in LWA
and implemented in teaching process?

iii. Is there any significant difference in mean score for work-process-
orientation in teaching process between participating companies?

In addressing this third research question, the researcher will utilize the determined
areas and characteristics of work-process-orientation which was arranged in the form of
assessment scheme. With this regard, two aspects of teaching strategies will be
highlighted, pertaining: (i) the development of LWA and other relevant training
material, and (ii) the implementation of training based on LWA and other relevant
training material. Two NDTS participating companies which were selected as a case
study actively engaged to provide the necessary information thus leads to achieving
related research objective. Both stage being assessed by compliance assessment scheme
through qualitative approach utilizing interview, content analysis and observation. As an
addition, the finding for the implementation stage will be validated by the result
obtained from survey conducted to apprentices from both participating companies.
Descriptive and inferential statistics will be used where the study focuses on mean and standard deviation (descriptive) as well as independent sample t-test (inferential). The independent sample t-test uses to determine whether there is a significant difference between this two participating companies with regard to work-process-orientation teaching process. Therefore the researcher identified the null hypothesis as:

i. Null hypothesis: There is no significant difference for the mean score of work-process-orientation characteristics in teaching process between Puspakom and Samling.

\[ H_0: \mu_{\text{Puspakom (WPO characteristics)}} = \mu_{\text{Samling (WPO characteristics)}} \]

1.7 Conceptual research framework

As mentioned previously, the study focuses on the teaching strategies for NDTS implementation in Malaysia which based on work process knowledge. Therefore, the researcher needs to have a clear understanding of what NDTS teaching strategies is all about particularly pertaining the development and implementation of LWA as a main instructional tool. In order to make conceptual distinctions and organize ideas for conducting empirical research, the researcher had developed conceptual research framework to be used. Miles and Huberman (1994) defined a conceptual framework as a visual or written product, one that “explains, either graphically or in narrative form, the main things to be studied—the key factors, concepts, or variables—and the presumed relationships among them”. A conceptual framework is also practically and commonly used by educational researchers to refer to a structure for guiding, supporting or enclosing their research studies based on a theory or more. For the purpose of this study, the relationship between all underpinning theories and research studies are summarized in Figure 1.3.
In the context of this study, the conceptual research framework is started with exploring the concept of work process knowledge. The term ‘work process knowledge' refers to the knowledge needed for working in flexible and innovative business environments, including those in which information and communication technologies have been introduced to integrate previously separated production functions (Boreham, 2004). It involves a systems-level understanding of the work process in the organization as a whole, enabling employees to understand how their own actions interconnect with actions being taken elsewhere in the system. Boreham (2004) also states that work process knowledge is ‘active' knowledge that is used directly in the performance of work, and is typically constructed by employees when they are solving problems in the workplace. It is more than simple know-how because constructing it involves synthesizing knowhow with theoretical understanding.
With regard to the dual system training, Bauer & Przygodda (2003) highlight the development of new learning concepts within the dual vocational education and training (VET) system, and ultimately to increase the effectiveness and quality of learning. The study then focuses on dual system teaching strategies concerning LWA as a main instructional tool and training delivery based on LWA and other relevant training materials. The explorations will lead to the determination of work-process-orientation characteristics that need to be embraced and can be used to assess the level of compliances for work-process-orientation by NDTS participating companies.

1.8 Significance of the study

This study is very important since no similar effort has been done earlier especially to investigate the teaching strategy for NDTS approach. The results of the study will be able, firstly, to contribute to the development of the knowledge and understanding of the work-process-orientation teaching strategies concerning LWA as a main instructional tool in the implementation of NDTS in Malaysia. Secondly, the results will benefit LWA developer especially in helping facilitator, coach and trainer to develop more effective LWA. Thirdly, since there is no systematic evaluation tool available on teaching strategies for NDTS, the results could be used by DSD and participating companies as a basis in evaluating the extent of work-process-orientation in the development and application of LWA and other relevant training material.

1.9 Scope of the study

In this study, researcher will investigate the teaching strategies for NDTS implementation in developing holistic k-worker. Therefore, researcher will focus on the work-process-orientation for the LWA and other relevant training material development as well as for the training delivery. In order to ensure that the investigation can be undertaken with sufficient depth, only one specific industry has been selected, namely the Transportation as classified in NOSS and NDTS Curriculum Registry. The selection of the transportation industry for this study is due to the reason that the industry has been
a part of the NOSS system since 1975, and it is also among the earliest industry to be included for NDTS implementation.

1.10 Operational definition

In this section, researcher reviews the definition of teaching strategies in general and specific for this study. Teaching strategies has been understood as the ‘tools for teaching and learning’ that teachers have available to them and ‘teaching skills’ are the ways in which teachers select and use the ‘tools’ at their disposal to achieve effective learning (Faraday et al., 2011). Teaching strategies also refers to the structure, system, methods, techniques, procedures and processes that a teacher uses during instruction. Teaching strategies is a way to help student study effectively for getting their purpose. Teaching strategies that must be prepared by the trainer or coach including goal identification, selecting subject matter, method, and teaching media, shaping suitable learning environment and situations, student activity, evaluation, and teaching management (Dedi, 2008).

For NDTS, the components which didactics is concerned with are related to the work process and the LWA are the core elements as instructional tools to foster self-reliant learning and teamwork. The LWA are designed based on actual work assignments adapted for the learning process (DSD, 2010). They are closely related to assignments for workers at the workplace or they are real assignments from a specific workplace. The activities carried in completing LWAs are those typical of an occupation, including social and organizational aspects as well as the specialized technical skills. LWA can be designed for individual work as well as teamwork. The workplace assignments are adapted for learning process by formulating instructions, guiding questions and hints to guide the apprentices through each step of the complete action cycle.

Therefore, teaching strategies in this study will be referred to the development and application of LWA and other relevant training material for NDTS implementation. It focuses therefore to the work-process-orientation on the development of LWA and other relevant training material and how it is to be implemented in workplace training.
1.11 Thesis outline

This chapter outlines the introduction to the thesis, setting out the reasons why this study is being conducted and the focus of the researcher’s attention. Then the thesis is organized into a further five chapters. A brief outline of each chapter is described as follows:

**Chapter 2: Literature Review** presents a review of the current literature on work process knowledge and training concept for dual system. This chapter also explores the underpinning principles related to the participative and work-process-oriented curriculum and LWA development. The explanation of the implementation of LWA is also given.

**Chapter 3: Research Methodology** presents the methodological approach adopted in the study. Fundamentally, the research design and sampling frame are detailed for both qualitative and quantitative approaches and operating procedures to conduct the study are explained. The types of data analysis are also included.

**Chapter 4: Data Analysis and Findings** describes the process of data analysis and results for each method being used. This section comprises of an empirical study that aim to investigate the extent of work-process-orientation being considered in the development of LWA and other relevant training material and how it is to be implemented in teaching process. Results for each research questions are organized in this section.

**Chapter 5: Research Discussions, Recommendation and Conclusion** summarize the key findings of the research and discuss it based on the research context. This chapter also highlights the theoretical and practical contributions of the thesis, while the limitations of the research are outlined. Suggestions for future research are also offered and conclusion of the findings is given at the end of the chapter.
CHAPTER TWO

LITERATURE REVIEW

2.1 Overview of chapter

This chapter reviews the relevant literature related to the implementation of NDTS particularly the requirement of teaching strategies. The discussion will start with exploring the concept of work process knowledge then followed by the argument and justification for shifting the current training concept to dual training concept. From this concept, the discussion will focus on the work-process-orientation teaching strategy for NDTS. It will discuss the development of training material to be used and the requirement for delivery process of it. Therefore, this chapter will be divided into 9 sections; (1) the concept of work process knowledge; (2) the new training concept for dual system, (3) the development of VET curriculum, (4) Work-Process-Oriented curriculum development, (5) participative curriculum development, (6) The Learn and Work Assignment (LWA), (7) the construction of the Learn and Work Assignment (LWA), and (8) implementation of the Learn and Work Assignment (LWA).

2.2 The concept of Work Process Knowledge

The changes in technology and organization of work as well as changes in economic structure resulting in growing demands on both work content related competences and work process knowledge. Therefore, the concept of ‘work process knowledge’ has been introduced to overcome the dilemma of ‘inert knowledge’, that is knowledge which has been taught but has not proved useful in practice (Kruse, 1996). The concept of work
process knowledge was developed by a 10-country research network within EU Framework IV Targeted Socio-economic Research program under Work Process Knowledge in Technological and Organizational Development Project (WHOLE Project). This concept is based on the premise that much of the knowledge that guides and support work is created through the process of work itself (Boreham, 2004). Three main factors that recognize the importance of this knowledge are listed below:

i. Global competition has been met by developing more organic ways of organizing work. Nowadays, the workers are expected to work across boundaries and contribute to continuous improvement in order to maintain a customer focus, achieve quicker times to market and increase productivity. Therefore, they need to understand the work process in the organization as a whole.

ii. There has been strong pressure to orient vocational education and training towards the actual requirements of work. Therefore, the curriculum design should be based on models of the total work process rather than on the academic disciplines and concepts.

iii. It is recognized that the knowledge base that underpins the work of intermediate-level employees extends beyond engineering science and includes the knowledge which they construct in the context of their work.

Boreham (2004) define work-process knowledge as ‘active’ knowledge that is used directly in the performance of work, and it is typically constructed by employees when they are solving problems in the workplace. According to Boreham & Fischer (2009), work process is an understanding of the work processes in an organization as a whole and not restricted knowledge base which underpins an individual task or narrowly defined job within one department of that organization. It enables employees to understand how their own actions interconnect with actions being taken elsewhere in the organization, which is the important requirement for collective competence (Boreham, 2004). In summary, Boreham & Fisher (2009) define work-process-knowledge in terms of four main attributes:
i. Work process knowledge is a system level understanding of the work process in the organization as a whole.

ii. Work process knowledge is actually used in the performance of the work in question – it is ‘active’ as opposed to ‘inert’ knowledge.

iii. Work process knowledge is constructed by employees while they are engaged in work, particularly when they are solving problems involving the reconfiguration of the work process.

iv. Work process knowledge is typically reconstructed by synthesizing codified and experiential knowledge in a dialectical process of resolving problems in a workplace.

The concept of work process knowledge is increasingly used in discussions exploring the relationships between work, learning on-the-job, organizational development, individual knowledge, collective knowledge and occupational competence (Boreham & Fischer, 2009). The concept signals more than practical know-how or ‘procedural knowledge', for this way of knowing also encompasses theoretical understanding. For this reason, the concept is a generative one which provides a framework for understanding how contradictions between theory and practice - and contradictions within practice - are resolved in the context of work. It also provides a framework for building effective partnerships between vocational education carried out in institutional settings and learning on-the-job.

Therefore work process knowledge has become the main conceptual tool for curriculum development and the curriculum research and development need to be given highly consideration because there is a close interrelationship between employees’ competencies and curricula that are going to be used for training implementation. With this regards, the concept of work process knowledge is uses for developing vocational curricula for flexible and innovative workplaces where knowledge creation is an important part of the work. As we move into the knowledge-based economy, knowledge creation becomes integral to the new ways of organizing work where learning becomes the new form of work, and then new frames of reference and new concepts are needed to underpin vocational curriculum development.
2.3 New training concept for dual system

Malaysia had been using NOSS-based training system which is based on job functions of the DACUM procedures since 1992. The term “National Occupational Skills Standards (NOSS)” was introduced following the decision of the National Vocational Training Council (NVTC) at its No.4/92 meeting on December 9, 1992 which leads to the new framework and methodology for developing the skills standard. The NOSS-based training system rely on the following features (Alto et al., 2000): (1) competencies to be achieved in training for a particular job are identified by expert workers and practitioners, and clearly spelt out in NOSS (2) competencies are clustered around duties in NOSS so that training, as well as assessment and certification, can be more flexibly packaged and implemented (3) assessment of competencies emphasizes actual performance based on specified criteria (4) self-paced and self-directed learning increasingly become the norm in training in which trainees progress at their own paces, rather than be dictated by their instructors or groups. (5) self-directed learning increasingly becomes a key feature of training, whereby trainees take greater responsibility for their learning, whilst instructors function as facilitators and resource persons. This training system which employs competency-based training (CBT) according to the British model focuses on the definition of a differentiated system of skills which is in most cases externally assessed in order to verify required competencies in an objective way.

However, the NOSS developed from duties, tasks and steps of work at the workplace does not consider work processes and uncertainty (Hoepfner & Koch, 2003). The orientation of NOSS which are based on job function of the DACUM procedures that narrow down to duties and task causes a major skill gap between the supply of training institutions and the requirements of the industry. In addition, the implication of increasing complexity and accelerated technological change in the workplace has become so dramatic that they increasingly render the competency-based training approach obsolete. On the other hand, the experience-based and workplace training become more relevant because it follow the incorporation of ongoing change in a ‘work-
process orientation’ of training. It also relies on the training potential of actual work situations.

Therefore, the National Dual Training System (NDTS) was introduced to modernize the ‘competency-based’ system. The introduction of NDTS also to meet the intensified demand for highly skilled workers resulted from changes in work process due to rapid technological advancement. The importance of NDTS in TVET system in Malaysia can be seen through Tenth and Eleventh Malaysia Plan where concerted effort will be undertaken to mainstream its implementation. Among initiative are more public and private TVET institutions as well as industry will be encourage to participate in NDTS (EPU, 2015b). However, the NDTS implementation requires the changes that must take place in various aspects particularly regarding the teaching strategy. This requirement has understood as Grubb and Ryan (1999) has come up with conception of human capital development which is more precise about the changes that must take place before a VET programme has any meaningful effect. In it, there are at least four different stages, each linked to its predecessor through a particular process. The four stages of human capital development are the following:

i. implementation study,
ii. the learning process,
iii. changing economic behaviour in the labour market and on the job
iv. creating long-run employment and non-employment outcomes

From these four stages, the learning process presumably increases the skills or competencies of the individuals. The processes generating increases in competencies are those involving teaching and learning, and enhancing these competencies therefore requires an understanding of teaching and learning. Besides, evaluation on teaching and learning strategies become so important this day. The evidence produced is used for major decisions about the future in vocational and education training. According to Berk (2005), there are two types of decisions: formative, which uses the evidence to improve and shape the quality of teaching, and summative, which uses the evidence to “sum up” overall performance or status to decide about annual merit pay, promotion, and tenure.
The former involves decisions to improve teaching; the latter consists of personnel decisions.

The changes in the VET system as well as in societal and labour market demand could be summarized as a multi-level transformation process of man power demand driven, reactive and reproduction oriented VET planning and curriculum design towards more open, dynamic, shaping and career oriented approaches of organizational as well as professional development in flexible VET systems (Onstenk, 2008). In order to train students for widely accepted competency levels in the labour market, it is important to improve the quality of vocational education systems. VET is expected to prepare students for life in broader sense. The aim for planning and development becomes to anticipate how employment will evolve and to give individuals a knowledge-base that will enable them to benefit from mobility.

By the global development in challenge 21st century, teaching process not only an information process, but also must be developed in any kind way, so human resources competency can be improved to become an adaptive and creative match with the purpose. Report to UNESCO of the International Commission on Education for the Twenty-first Century (UNESCO, 1996) state that long life education as a building that build by 4 aspect: (1) learning to know or learning to learn, mean learn to get knowledge and learn continually, (2) learning to do, mean learn to have base competency in correlation with different situation and team work, (3) learning to live together, mean learn to can appreciate and do the depended condition, variety, knowing each other, and peace inter country, (4) learning to be, mean learn to self-actualization as an individualism that have a responsibilities.

To face the challenge of 21st century era development, need to develop a teaching and learning strategy and model that can give an interesting situation for teacher and student. The quantum learning and quantum teaching, as a fact develop a teaching and learning model and strategy effectively in a good situation and enthusiasm. Last time ago and perhaps today, situation of teaching learning perception as boring situation, not motivated, and frightened, so that student could not develop their capabilities. This condition must be changed so that the teaching and learning become more effective to produce competence workforce. One of the most practical solutions according to
REFERENCES


Handbook of Education for the Changing World of Work, Springer Science+Business Media B.V.


DETYA (2001). Kit to support assessor training. Department of Education, Training and Youth Affairs (DETYA), Melbourne, Australia


Media Statement: *MIDA Annual Media Conference On The Performance Of The Manufacturing And Services Sectors In 2009* YB. Dato' Sri Mustapa Bin Mohamed, Minister of International Trade and Industry, 4 February 2010


Pemandu (2010). Economic Transformation Programme: A Roadmap for Malaysia. Performance Management and Delivery, Prime Minister’s Department, Putrajaya


Reiter, B. (2013). The Epistemology and Methodology of Exploratory Social Science Research : Crossing Popper with Marcuse. *Government and International Affairs Faculty Publications*. University of South Florida.


Spottl, G. (2008). Teacher Education for TVET in Europe and Asia: The Comprehensive Requirements in Proceeding The First World Congress on Teacher Education for TVET, Indonesia


