EFFECTIVENESS OF LEARNING TRANSFER IN NATIONAL DUAL TRAINING SYSTEM (NDTS)

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ABSTRACT

Learning transfer is the ultimate goal of any training programme. The new Malaysian skills training is based on the dual learning principle in which trainees alternate between attending theoretical classes in the skills training institute and receiving on-the-job training at worksite. This new paradigm of skills training is better known as National Dual Training System (NDTS). The main problem is that there were complaints from the employers that the competencies of the output of the skills training in Malaysia are of poor quality. This was due to low absorption of learning transfer performance from training places to workplace. Apart from that there were little studies related to the effectiveness of learning transfer due to there is no acceptable way and mean to measure the learning transfer. The aim of this study was to ascertain on whether the effectiveness of learning transfer did occurred in the automotive mechatronics of NDTS programme. The research focus area is the Mechatronics Automotive course. A longitudinal study method was employed as the research methodology. The participants of this research were the trainees and coaches from NDTS Mechatronics Automotive course. The study utilised the self-administered questionnaire, semi-structured interview, focus group and case study. Measuring 16 factors of the Learning Transfer System Inventory (LTSI) plus 3 factors derived from literature review and expert group discussion enable the researcher to determine the relationship between the learning transfer factors. It was found that NDTS training programme appears to have facilitated the positive transfer and near transfer from training situation to workplace environment. The findings of multiple regressions result suggest that the predictive variables explained 43.9% variance that has significance effect on the effectiveness of learning transfer. Apparently, the most influential dimensions of the effectiveness of learning transfer in NDTS were revealed as the course content, training delivery and working tasks. Interestingly, result indicated that the effectiveness of learning transfer in NDTS had occurred by the overall framework accuracy percentage of 79.2%. Therefore, the emerging effectiveness of learning transfer framework of NDTS in Malaysia is proposed.

ABSTRAK

Pemindahan pembelajaran merupakan sasaran utama kepada setiap program latihan. Sistem latihan kemahiran baru yang diperkenalkan oleh Malaysia adalah berdasarkan kepada prinsip latihan dwi lokasi latihan iaitu latihan di institusi latihan kemahiran dan latihan di tempat kerja. Paradigma baru sistem latihan ini lebih dikenali sebagai Sistem Latihan Dual Nasional (SLDN). Rungutan dari para majikan tentang kualiti para graduan yang tidak menepati keperluan industri adalah disebabkan oleh kelemahan pemindahan pembelajaran. Selain itu, tidak banyak kajian yang telah dilaksanakan mengenai keberkesanan pemindahan pembelajaran dari tempat latihan ke tempat kerja kerana tidak terdapat cara dan kaedah yang sesuai untuk mengukur keberkesanan pemindahan pembelajaran. Tujuan kajian ini adalah untuk menentukan keberkesanan pemindahan pembelajaran bagi SLDN. Fokus utama kajian ini adalah tertumpu bagi kursus Otomotif Mekatronik. Metodologi kajian adalah berbentuk *longitudinal*. Para peserta kajian ini adalah terdiri daripada kalangan para pelajar dan pengajar kursus. Kajian ini menggunakan borang kajiselidik, temuduga separa-berstruktur, kumpulan fokus dan kajian kes bagi mengukur 16 faktor inventori pemindahan pembelajaran beserta 3 lagi faktor tambahan yang dikembangkan dari kajian literatur serta perbincangan pakar berkumpulan bagi menentukan perkaitan diantara faktor-faktor pemindahan pembelajaran. Hasil kajian mendapati program latihan SLDN telah menghasilkan pemindahan pembelajaran berbentuk *positive transfer* dan *near transfer* dari tempat latihan ke tempat kerja. Dapatan kajian dari regresi pelbagai mengesyorkan bahawa pembolehubah ramalan menjelaskan 43.9% varian yang signifikan ke atas keberkesanan pemindahan pembelajaran. Jelasnya, dimensi utama yang mempengaruhi keberkesanan pemindahan pembelajaran SLDN adalah *course content*, *training delivery* dan *working tasks*. Keputusan kajian juga mendapati keberkesanan pemindahan pembelajaran telah berlaku dengan ketepatan kerangka kerja pada 79.2%. Dengan yang demikian, satu kerangka kerja keberkesanan pemindahan pembelajaran telah dapat dicadangkan.

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BMI	-	British Malaysia Institute
EPU	-	Economic Planning Unit
CBE	-	Competency Based Education
CBT	-	Competency Based Training
CBL	-	Competency Based Learning
CIAST	-	Centre for Instructor and Advanced Skill Training
DACUM	-	Developing A Curriculum
DSD	-	Department of Skills Development
ITB	-	Institut Technik Und Bildung
JPK	-	Jabatan Pembangunan Kemahiran
LWA	-	Learn and Work Assignment
LTSI	-	Learning Transfer System Inventory
MARA	-	Majlis Amanah Rakyat
MLVK	-	Majlis Latihan Vokasional Kebangsaan
MSC	-	Malaysian Skills Certification
NASDA	-	National Skills Development Act
NDTS	-	National Dual Training System
NOCC	-	National Occupational Core Curriculum
NOSS	-	National Occupational Skills Standard
NVTC	-	National Vocational Training Council
NVivo	-	Qualitative Analysis Software Package
SKM	-	Sijil Kemahiran Malaysia
SPSS	-	Statistical Package for the Social Science
SRL	-	Self-Reliance Learning
TVET	-	Technical Vocational Education and Training
VET	-	Vocational Education and Training

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CHAPTER 1

INTRODUCTION

1.1 Education and training in Malaysia

In the wider context of Malaysia's Vocational Education and Training (VET) system, skill training is one of the very important components of it. Skill training has become an increasingly recognisable and distinct component within the VET system in Malaysia. Anyhow, the main issue in Malaysia VET scenario is about the effectiveness learning transfer of the VET especially, the skills training programmes in meeting the dire needs of industries. One of the outstanding problems of vocational training in Malaysia is that there were very limited studies related to the effectiveness of learning transfer in our skills training programme (Mohd Alwi, 2006; Hashim, 2001; Pillai & Othman, 1994). The change toward a more national orientation for effective skills training necessitates the need to understand the nature of learning transfer.

Three obvious shortcoming of previous research studies regarding VET in Malaysia are (i) the non-existent of theoretical framework of effectiveness of learning transfer either in the existing system (NOSS) or in the newly implemented system (NDTS) has exaggerated the problem condition of our country research and training development effort, (ii) the nonexistent of reliable and validated instrument to measure the learning transfer event, and (iii) no idea of how good is the learning transfer that is shaping. Therefore, these obstacles have hindered us from making great improvement to any of the problem areas of those systems.

The learning transfer from learning environment to the workplace has been an area of interest to researchers in a number of different fields including skills training and education. A broader definition of effectiveness of learning transfer in any skill

training is the extent to which training has the long-term effect in workplace and the identification of factors which facilitate learning transfer (Asian Development Bank, 2004; Tai, 2006). Thus, learning transfer is an extent to which training meets its objectives. The important of evaluation of learning transfer is the amount of specific knowledge and skills that trainees retain and used to improve their competence performance at real workplace. Thus, success of the skill training programme is only accomplished when trainees can successfully learn what was taught during training and use it at their workplaces (Nielsen, 2009). Therefore, what counts in every training programme is whether the trainees are able to transfer and apply the skills they learn to their work (Nikandrou et al. 2009).

1.2 Vocational education and training in Malaysia

In 1979, a Cabinet Committee was formed to study the implementation of the national education policy. One item on its agenda was to review the technical education and vocational system in Malaysia. As a result of the report, the schools systems were simplified, leading to two distinct secondary educational routes: academic and vocational. After several reviews and changes, the system reached its present structure where technical schools come under the purview of the Ministry of Education and subjected to the Education Act in 1996 (Act. 550), whilst industrial training institutes or skills training centres were under other ministries and agencies (Othman, 2003) thus govern by the 652 Act or better known as National Skills Development Act (NASDA, 2006).

The Cabinet Committee on Training in 1991 also triggered a major overhaul of Malaysia's national skill training system. As Othman (2003) pointed out, the vocational training in Malaysia since then was seen to be adopting the Competency Based Training (CBT), Competency Based Learning (CBL) and Competency Based Education (CBE) approaches for its training delivery system. In other words, this training format is believed to provide a more structured and systematic approaches to the development of continuous formative and summative evaluation in an occupational training programme so called National Occupational Skills Standard (NOSS).

In Malaysia, the publicly-funded, skilled and semi-skilled training institutions form an important part of the national training system. These training institutions introduce basic vocational and technical skills before employment and they include secondary vocational schools, technical colleges, Industrial Training Institutes (ITIs), MARA Skills Institutes (IKMs), National Youth Skills Institutes (IKBNs), Polytechnics and other government skill training institutions. Generally, these institutes provide full-time vocational and industrial training for post-primary and secondary school leavers as well as skill upgrading programmes for employees.

Apart from that, there are also advanced skill training centres run by the government and also in collaboration with major multi-national corporations (Wan Aziz, 1994) the local private sector, and foreign governments. These institutions include Centre for Instructors and Advanced Skill Training (CIAST), Penang Skill Development Centre (PSDC), German-Malaysian Institute (GMI), British-Malaysia Institute (BMI), French-Malaysia Institute (FMI), Japan-Malaysia Technical Institute (JMTI) and etc. There are also numerous private training institutions that contribute an equally important share to this initial training, often at high levels of quality, with the training costs paid by the trainees. In order to supply the steady supply of the semi skilled and skilled manpower, many skills training institutes were established. To date, there were various skills training institutes under the jurisdictions of respective ministries. For example, IKMs under the Ministry of Entrepreneurships, ITIs are under the Ministry of Human Resources as well as IKBN and IKTBN under the Ministry of Youth and Sports.

Previously, skills' training in Malaysia is largely seen to be based on the National Occupational Skill Standards (NOSS) which has been developed through Developing A Curriculum (DACUM) approach that was purely based on task and duty of an occupation. Thus, the NOSS content having its own limitations such as it does not reflects the steadily increasing complexity of work situations and the accelerated pace of technological change in high-tech areas such as in automotive industry, have shortened the reasonable longevity of relevant skills which is indispensable for competency-based training (Loose & Juri 2008). Therefore, effectiveness of learning transfer from NOSS-based learning environment to workplace is said to be incomplete or is at stake. In order to improve the

effectiveness of learning transfer, starting from year 2005 skills training in Malaysia is now adopting for the more systematically German Dual System which is focus on the work process that is based on the core working tasks curricula derived from the industry content-base panel of experts. This new curricula is better known as the National Occupational Core Curricula (NOCC) acts as an enabler toward the effectiveness of learning transfer issue. In addition, to realise the effectiveness of learning transfers in operational, the full potential of Self-Reliance Learning (SRL) needs to be activated (Loose & Juri, 2008).

1.2.1 Vocational education and training: Economic standpoint

Malaysia is a nation whose economic base is undergoing transformation. In recent decades, Malaysia has transformed itself from a country that long depended on agricultural commodities and mining to an industrializing economy. Malaysia's real Gross Domestic Product (GDP) has grown by an average of 5.8 per cent per annum from 1991 to 2010 (Tenth Malaysia Plan, 2011–2015). This growth rate has helped at improving the quality of life for Malaysians and supported widespread advances in skills training specifically. Example of industry that contributed to the GDP; for the manufacturing industry are Automotive, Electrical & Electronics products, Oil & Gas, Textile & Plastics, whereas for services industry are Tourism & Hospitality, Cosmetology, Insurance, and Banking (Master Plan of Malaysian Occupational Skills Development and Training 2008-2020, 2008).

The rapid transformation process as a result of the government's commitment towards a knowledge base economy has brought about the consequence of shortage in knowledge skilled manpower (ISIS, 2002). Therefore, the focus of vocational training will be to supply knowledge workers to meet the demands of industry. Based on the projections prepared by the Economic Planning Unit (EPU) for the years from 2005 to 2020 alone shows that the number of K-workers from the NDTS programme that will be trained are 31,500 with the need for 1,575 trainers and 10,500 coaches (Master Plan of Malaysian Occupational Skills Development and Training 2008-2020, 2008). Consequently, the demands for knowledge workforce

necessitate more intensive, comprehensive and flexible training programmes that can result in better transfer of learning from training environment and workplace.

Officially, the Knowledge Based-Economy Master Plan was launched in year 2002 and contains 136 recommendations to accelerate the transformation to a knowledge-based economy (ISIS, 2002). The strategic thrusts include enhancing competitiveness to meet the challenges of globalisation and liberation, developing a knowledge-based economy and strengthening human resource development to produce competent, productive and knowledge workforce. Hence, eight major variables that have been identified as targeted critical indicators of added value to ensure Malaysia's elevation to knowledge-based economy are research & development, technology and process creation, product development and design, production, packaging, marketing, distribution and after sales support (Md. Zain, 2008).

1.2.2 The Malaysian VET system reform

In Malaysia, the role of producing the semi-skilled and skilled workers relies heavily on government funded training centres. As of year 2010, there are 247 public VET institutions mainly under the umbrella of nine (9) ministries registered under the Malaysian Skills Certifications system controlled by the Department of Skills Development under the Ministry of Human Resources. The ministries involved are Ministry of Human Resources with 28 institutions followed by the Ministry of Youth and Sport (16), Ministry of Education (68), Ministry of Defence (10), Ministry of Rural and Regional Development (94), Ministry of Women, Family and Community Development (1) and Ministry of Plantation Industries and Commodities (3). This portrays that Malaysian government is very committed towards its education and skills training development. One indicator of its commitment is the huge expenditure allocated to the establishment of many public vocational training institutions in every five years Malaysian Plan. This has resulted in a large increase in numbers of vocational colleges and skills training institutions built throughout Malaysia to ensure that VET supply keeps pace with the needs of an industrialised country status by 2020 (Gill et al., 1999).

Noticing the missing link of close interaction between the public training institutes and industry roles in producing skills workforce, the government of Malaysia has emulates the success of the German Dual Apprenticeships System into our newly National Dual Training System (NDTS). As a result, NDTS is a new outlook of the skills training scenario in Malaysia where it was designed and organised conceptually similar to the German Apprenticeships Dual System principle that is *duale Berufausbildung* which means that vocational education and skills training activities are the responsibility of industry with regard to learning at the workplace (including in company training centres) whereby, the formal education (theoretical learning) is the responsibility of the training institutions. The concept of Malaysian Dual System Project is shown in *Appendix 1, 2, 3 and 4*.

Traditionally, vocational and education training system in Malaysia has been targeted at equipping young people with job related competencies demanded by industries and employers. The training enhances the opportunities to enter the job market. The vocational training system in Malaysia is a single trade qualification with vertical progression as shown in *Appendix 5*. The courses are structured into five levels. The Malaysian Skill Certification (MSC) or commonly known as *Sijil Kemahiran Malaysia (SKM)* qualification framework comprises of Level 1, 2, 3, 4 & 5. The duration of training ranges between one and three years, depending on the qualifications, trades and levels of training (Manpower Department of Malaysia's, Seminar Guide, 2004). Base on the Manpower Department of Malaysia's Seminar Guide (2004) the types and definitions of skill certification are as in *Appendix 6*.

By its very nature, vocational training is incomplete without the experience that can only be acquired on-the-job. In other words, hands-on or learning by doing is said to be very effective approach in skills based training. One exploratory study conducted by Dymock & Gerber (2002) has demonstrated how college-based training is different from the learning that occurs in worksites. For this reason, most of the courses only provide industrial training or in-plant training. During the industrial placement phase, trainees will be introduced to the working environment at industry (Velde & Cooper, 2000).

However, Lasonen (1999, p.3) suggested those revising curricula to achieve a better fit working life wish to avoid the traditional term on-the-job training,

substituting it with the word workplace learning. This revising curriculum is said to be more dynamic and moving towards real workplace requirements of a particular job. Undoubtedly, this will enhance the learning transfer from learning environment to workplace setting. On the other hands, improving the curricula is seen as the first priority to reach better interaction between the industry and the school partners (Rauner, 2004; Spöttl, 2004). Consequently, this will leads to the effectiveness of learning transfer.

1.2.3 NDTS: The new Malaysian apprenticeship training system

The request from the industrial sector for more skilled (hands-on) and knowledgeable workers have also called the government to introduce the more systematic and versatile new system i.e. NDTS. Thus, in May 2005, the Malaysian government introduced National Dual Training System (NDTS) programme from the cabinet decision under 8th. Malaysian Plan, which involved joint cooperation between industry and training institution. This programme's involve training at two venues consolidating theoretical modes of training at training institutions and practical modes comprising the real core work processes at industry. The training is called "dual" because vocational education and occupational training are provided simultaneously to the trainees by the training institution and employer respectively (Indermit & Amit, 1996, p.144).

The effort to expand the implementation of NDTS is clearly stated in the Malaysia Skills Training Blueprint (Master Plan of The Malaysian Occupational Skills Development and Training 2008-2020, 2008). The targeted measures to take place are summarised as follows:

i. Expand the incentives to companies or industries;
ii. Integrate the Human Resource Development Corporation (HRDC) Apprenticeship Training System with the NDTS;
iii. Recognise industry training programmes;
iv. Establish specialised NDTS programmes for experienced workers;
v. Improve the image and status of skills workers by creating a new category of 'master craftsmen';

vi. Implement the NDTS training programmes to decrease dependency on foreign workers;
vii. Apply a more flexible format and implementation approach to attract companies, individuals, community, associations and others; and
viii. Conduct promotion and awareness programmes on a wider and larger scale to the industry and the Malaysian to gain support and make NDTS as the path of career choice.

1.3 The duality of vocational education and training

The duality of vocational training can be defined as a combination of learning in the company and learning in the vocational training institution or skills training centre where the companies concentrate on imparting practical knowledge while the vocational school/training centre delivered the theoretical aspect of knowledge to trainees or learners. This duality of vocational education and training are very crucial for the sustainability of the country in economic and social security. Typically, the dual system has differentiated between two learning places that is classroom learning in vocational training institutions and on-the-job learning in enterprise. Having established the difference and similarity, the learning setting needs to be synchronized and curricula need to be realigned to suit the new situation.

In order to have an insight view of the dual system training, first and foremost researcher would like to establish the work process knowledge approach used in German Dual Training System and then described the structure of the German Dual Apprenticeship System and follow by the National Dual Training System (NDTS). Subsequently, to grasp better picture of the NDTS training programme, researcher wanted to elaborate in details the work process knowledge approach because this is the gist of the content of the National Occupational Core Curricula (NOCC) and it also has significance impact on how to foster the effectiveness of learning transfer in NDTS automotive mechatronics course.

1.3.1 The work process knowledge in dual system

Fisher & Boreham (2004) explained the origin of work process has emerged from,

> A discussion of 'work process knowledge' can be traced to the 1920s, perhaps the earliest appearance of the term in recent times, in its German form *Arbeitsprozesswissen,* occurred in the context of a German debate the needs for reform of vocational education and training (p.14).

Referring to the above statement, historically work process knowledge has shown greatness in preparing the trainees or apprentices towards workplace. In other words, this was an evident of achievement in transferring learning from learning environment into workplace application. Interestingly, this was due to the fact that having elements of (i) a combination of theory and practices embedded in the training curricula and (ii) transferring or applying knowledge learns immediately in the workplace setting. Another, distinguished advantage is that this has exposed trainee to the real work or production processes that help them to settle more comfortably in a new environment that is the workplace.

The concept of work process knowledge in term of understanding about the process involved in a product related, social ecological and systems related dimensions that has been used to assist trainee or apprentice and trainers or instructors in overcoming the dilemma of 'inert knowledge' (Griffiths & Guile, 2004, p.284). Inert knowledge is referred to the knowledge which has been taught to the trainees but anyhow not proven useful in workplace practice. In other words, trainee cannot transfer their learning once at the work situation. In order to avoid the paradox of the inert knowledge that could not be transferred from learning to workplace, Rauner (2007, p.239) recommends that it is very important for an apprentice to has the systematically understanding of the 'active knowledge' or transferable knowledge that is the work process knowledge. In order to achieve this qualification, the curriculum must be design in such a way that it must includes and decode knowledge that can be transfer, applied and practice immediately. According to (Rauner, 2007),

> The turning point for curriculum design is that a person must have work process knowledge, concludes that from the ITB research from the early 1980s suggests that the key for a modern curriculum research requires the decoding of knowledge incorporated in the practical work (p.239).

Moreover, Rauner (2005, p.9) states that "The European research network on Work-process Knowledge", which was coordinated by ITB, developed a new foundation for TVET is summarised as follows:

i. Work process knowledge includes understanding of the work process and the production process in the organisations a whole. It is contrary to the Taylorist principle of narrow jobs, each underpinned by the minimal level of understanding needed to perform that job alone. It include the preparation of action control and evaluation of the work process/task;

ii. Work process knowledge is continuously constructed in the workplace by employees through experience and work itself, especially while solving problems in the workplace;

iii. Work process knowledge is directly useful for the performance of work, it is 'active' rather than 'inert' knowledge; and

iv. Work process knowledge is a synthesis of theoretical and experiential knowledge typically being constructed by resolving contradictions between codified knowledge and lived experience when solving problems in the workplace. It does not follow the traditional dichotomies of theories versus practice, declarative versus procedural knowledge, scientific knowledge versus know-how.

1.3.2 The National Dual Training System (NDTS)

Realising of the importance of having a more structured and systematic skills training programmes, the government of Malaysia has decided to introduce NDTS. This is due to the fact that the systematic and well developed skills training system is important at ensuring the competitiveness of the country. In achieving this vision, the Malaysian Cabinet has approved National Dual Training System (NDTS) on May 19, 2004. It stated that the global changes in technology, and particularly in the nation's industries, have created the need for skill workforce and a new comprehensive training system (MLVK, 2005). The NDTS is an apprentice training scheme modelled from German Dual System where training is carried out both in industry as well as in technical institutes. The government has given the role of

administering the development of NDTS to the Development of Skills Department (DSD), Ministry of Human Resource Malaysia, who is responsible for introduction, promotion and implementation of the system.

Employer is one of the very important stakeholders of NDTS programme and their role is to provide and support DSD with adequate inputs of their requirements and needs in term of knowledge, skill and competence of the 'K-workers'. Apart from that employers' must also actively participate in NDTS by providing training to apprentices according to Learn and Work Assignments (LWA), mixed approaches and four steps approaches as outlined in the National Occupational Core Curriculum (NOCC). Definition of LWA is an instructional tool consists of Problem Based Learning (PBL), discussion, tutorial, demonstration and lecture to foster Self-Reliance Learning (SRL) which integrates the actual workplace related assignment with the steps of the action oriented learning process as shown in Figure 1.1.

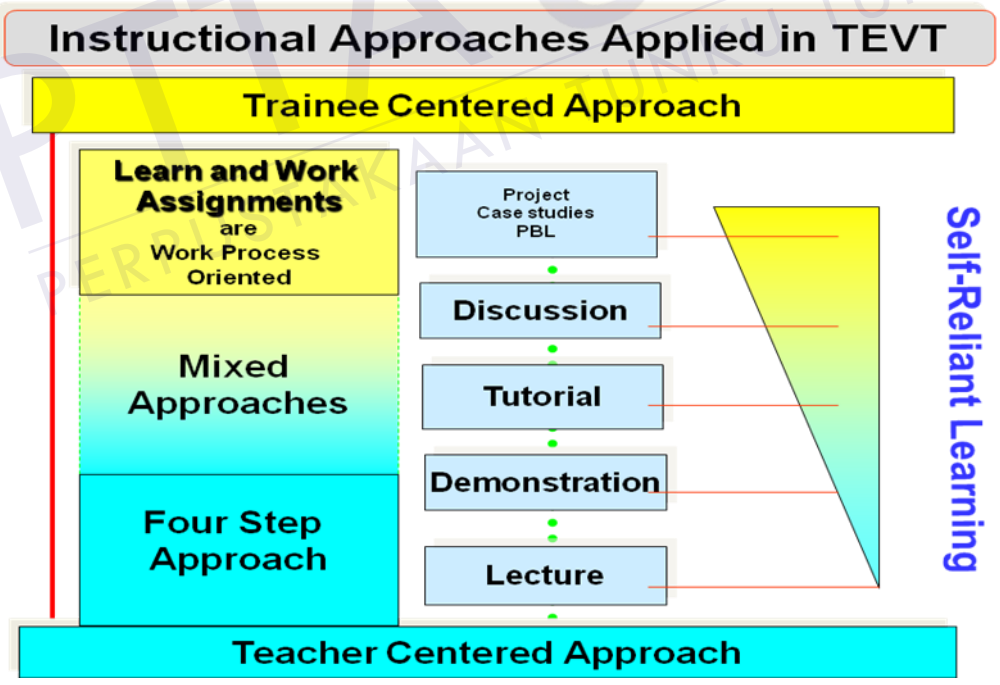

Figure 1.1: The instructional approaches in TVET (Source: MLVK, 2005, p.3)

On the other hand, the government funded training institutions will plays the role of public partner in the system by providing theoretical or basic training. Thus, the assistance of industries in NDTS implementation is very crucial. The essence of

NDTS is the practical training provided by industries in actual environment dealing with day-to-day problem of industry. The technology used in industry can only be trained effectively in an industrial environment whilst the theoretical aspects of it in the technical institutions. Thus, training in industry is the top priority in NDTS. Therefore, systematic and theory-based knowledge should help better understand the practical dimension of learning at the workplace.

Since NDTS training is carry-out at both institute and workplace thus this programme also in-lined with the existing apprenticeship programme runs and funded by Human Resource Development Fund (HRDF). Traditionally, most of skilled training is done fully in training institution. The curriculum is based merely on duty and task activities. Therefore, it is more focus to instructor-centred type of training approached. This has led to incompetence and dependable type of graduates once they are at the workplace and is said to be very slow in transferring their learning into their job. Without exaggeration this is a crystal clear indication that learning transfer was not in place. For better picture of the relevant parties role and responsibility in NDTS implementation is portrayed by Figure 1.2.

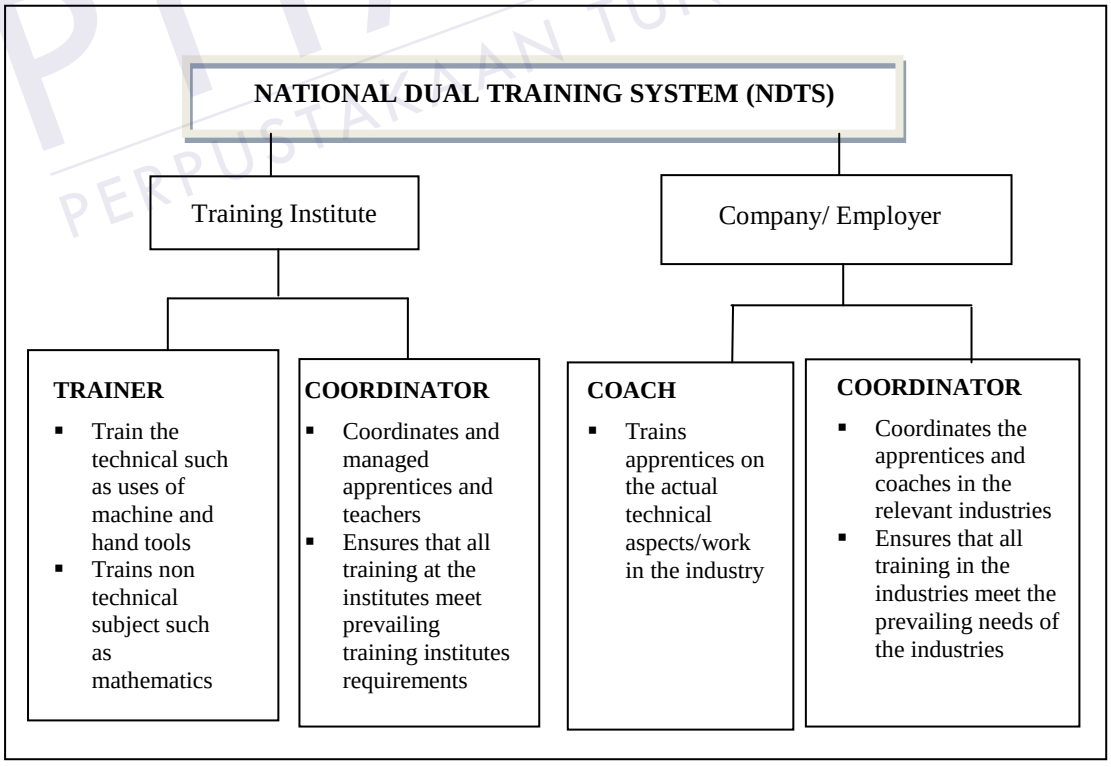

Figure 1.2: Parties involved in NDTS. (Source: MLVK, 2005, p.4)

According to MLVK (2005) as displayed in Figure 1.3 the overall learning and teaching in NDTS consists of two venues which are institute and workplace. The trainees are required to attend theoretical training at relevant training institute and practical training is carried out at the respective working environment. Working environment is the future trainees' workplace prospect once finished NDTS training. Trainee is also expected to be awarded with K-worker Level 3 certificate upon graduation. Eventually, trainees are expected to be absorbed into full employment once finished the NDTS.

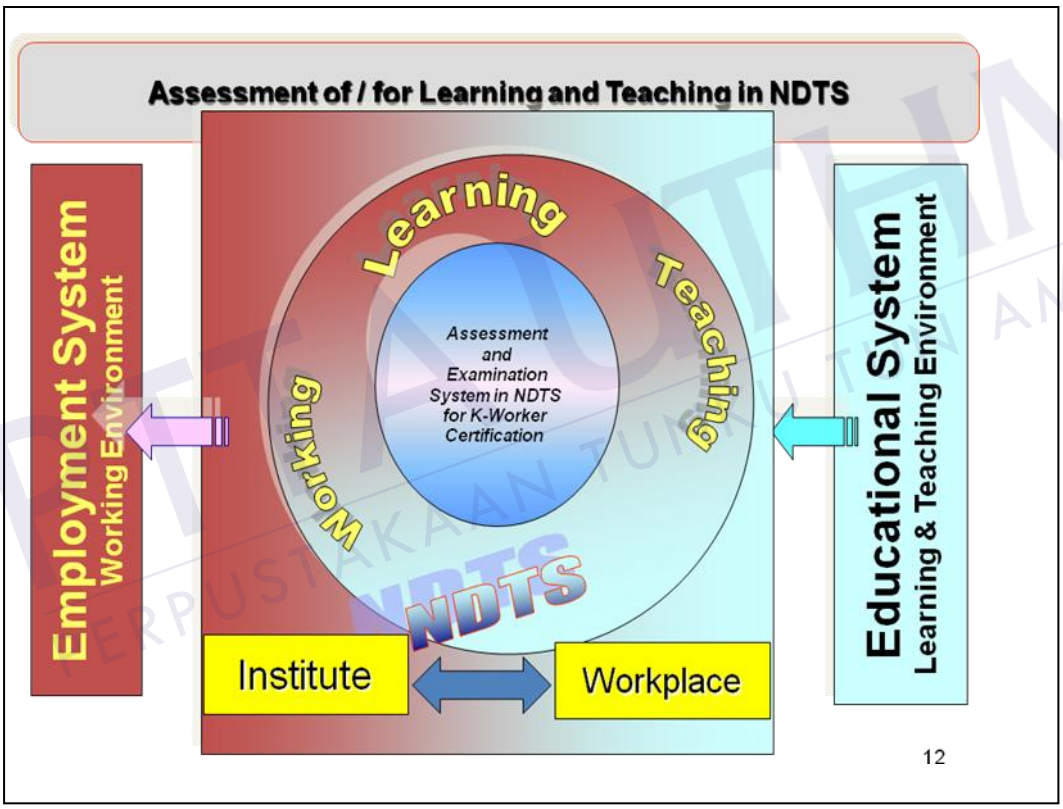

Figure 1.3: Learning and teaching in NDTS (Source: MLVK, 2005, p.5)

Hoepfner (2004) in his model of Work Process Oriented Instructional Tool in teaching and learning environment for NDTS (refer Figure 1.4) shows that the science of learning and teaching for the training of K-workers is based on the core work process oriented instructional tools. Moreover, the organisation of learning with objectives, contents, approaches and assignment are clearly defined. Objectively, it specify that the trainees in this setting will achieved competence

performance based on the core work process, self-reliance, nurture the life-long-learning and aspiring the construction of workplace knowledge, skills and attitude.

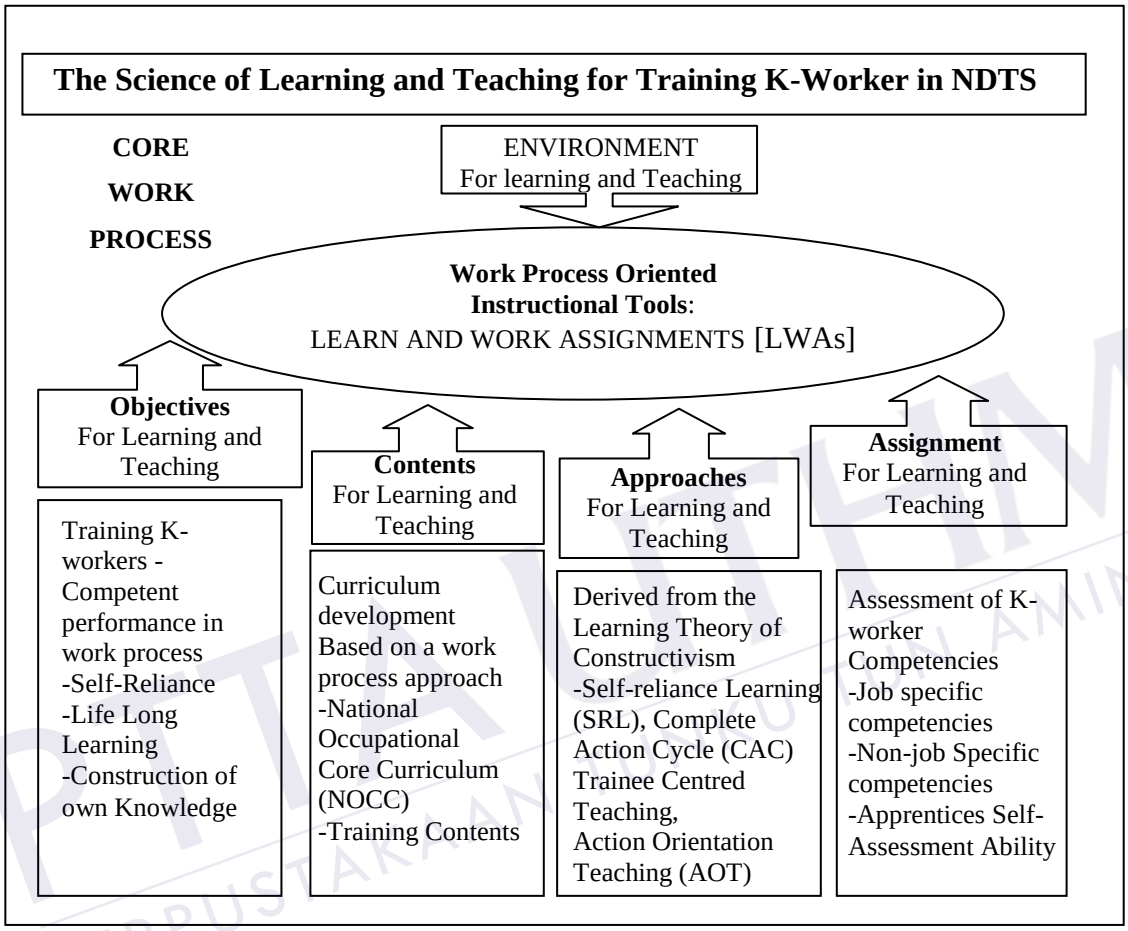

Figure 1.4: The Science of Learning and Teaching for Training k-workers in NDTS. (Source: Hoepfner. H. D. & Koch, H. BOBB, 2004, p. 21)

The instructor, trainers or coaches in NDTS should be aware of the goal of using core work process that is to conform to the norm of the dual system requirements in producing the K-workers. Thus far trainers in Malaysia skills training institutions have little exposure in work process orientation and to researcher personal experiences as the principal of one the industrial training institute, they are more familiar to duty and task type of training in NOSS-based on the so called accreditation system. Therefore, conducting training to the newly roles and responsibilities of the NDTS coaches must be emphasised to ensure smooth instructional delivery in training.

1.4 National Dual Training System (NDTS) implementation status

The launching of NDTS in Malaysia was due to, the fact that traditional full time institution-based vocational education and skills training is no longer able to ensure the best possible preparation for working life or meeting the current demands of industry. Various measures were asks to be implemented to improve the quality of training during the Ninth Malaysian Plan (EPU 2006). The implementation of NDTS is based on work processes approach through National Occupational Core Curricula (NOCC) and is believed could solve the learning transfer of the institutionalised type of training issue. In addition, the terms Self-Reliance-Learning (SRL), Action-Oriented Teaching (AOT) as well as Learn and Work Assignment (LWA) have been used as the fundamental teaching and learning approaches (NDTS, 2007).

However, work process based of training is still new to Malaysian vocational training scenario. Malaysian skills training was very used to the occupational based type elaborated deeply in term of duties and tasks of a training profile document so called National Occupational Skills Standard (NOSS). Therefore, according to Fischer (2002) the acquisition of work processes knowledge require the learner already to have acquire an occupational self-concept and motivation, and this is a broader task which must be addressed within much more general education. Work process knowledge therefore, must be studied and understand properly to enhance the learning transfer in NDTS.

Rapid changes in technology and increasing complexity of work processes in Malaysian industries have created the new demands on the skilled workforce, namely Knowledge-workers or K-workers who possess the technical competence and the ability to acquire and apply knowledge, as well as to learn continuously. Realising that the training for K-workers must utilise the workplace as the prime learning environment, the Government of Malaysia has decided to implement the NDTS at large. Thus, commencing from 2005 the target is to produce the skilled workers who are hands-on and who will fulfil the requirements of the industrial sector. NDTS is a combination of on-the-job training and related classroom instruction in which trainees learn the practical and theoretical aspects of a highly

skilled occupation. NDTS programme are sponsored by joint employer and labour groups, individual employers, and/or employer associations.

1.5 Background of the Study

Malaysia aspires to move up the value chain to become a high-income economy and must significantly increase its skilled workforce capabilities to meet fast changing industrial needs. Hence, Technical Education and Vocational Training (TEVT) development has become a major concerned in developing countries such as Malaysia. A successful vocational education at high quality level requires a focus on the core work processes of the industry when it comes to the intention of succeeding in the learning transfer matter. Trainees who attended skills training at institutions often are unable to perform tasks adequately at workplace because they lack sufficiently skills, knowledge and attitude. For instance, Devos et al. (2007) estimated less than 20 per cent of the knowledge and skills acquired in training are used on the job. Thus, classroom learning alone is not sufficient for learning transfer success; the workplace job exposure is also important. Therefore, learning transfer processes must have a close link to the relevant learning at skills training institutions intended for actual workplace needs.

However, one of the problems in TEVT system in Malaysia is that the graduates do not experience the connection between what they are taught at skills training institute and what they will have to face in the workplace (Loh, 2004). The lack of coherence between training imparted at skills training institute and workplace requirement makes the principle on which the current skills training system in Malaysia is under scrutinised. Apparently, traditional skills training system only caters the minimum skills requirement in term of very general duty and task of an occupation needed for one to gain a qualification. In addition, all duty and task spelled-out in its curriculum only centred on very narrow competency which is gain merely at skills training institutes without taken into account the industry needs. In fact, the graduates directly enter the labour market once finished their training without having the adequate knowledge, skills and attitude as per what the industry expects. Thus, the setback is on whether trainees have had the

qualifying training that is aligned to the labour market and therefore, this shortcoming has limited the desire for learning transfer to take place at greater depth.

The description of the issue and problem above mentioned can best be represented by a depicted Figure 1.7. The scenario seemed an indicator that lack of industrial workplace experiences and exposures had hindered trainee ability and capability in transferring their learning once at actual workplace. Importantly, this study seemed timely, justified and worthy for the researcher to uncover the hidden elements for successful learning transfer to take place.

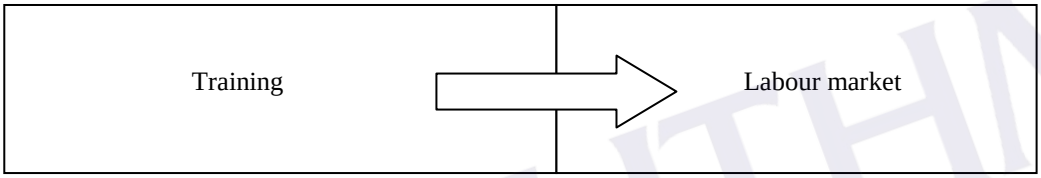

Figure 1.5: Traditional training system with learning transfer prospect (Source: Gessler, personal communication, 2008)

Ironically, the very obvious missing link for the skills training system is the invaluable real-time workplace exposure or experience. Hence, the consequences of separation between training and workplace were at large and had cause skills training graduates facing problem to transfer what they have learned once they are at workplace. First and foremost this has raise questions on the relevance and justification of the effectiveness of the learning transfer from training to workplace.

According to McHardy & Allan (2000, p.496); Lawrence & McCollough (2001, p.139) higher education and training has been under severe pressure by public and industries to improve the quality of its products (i.e. trainee/graduates). This is due to the fact graduates are said to be incompetence and do not possess the required skills as needed by the industries. Since NDTS programmes is still at infant stage in Malaysia, the study on its effectiveness of learning transfer will provides vulnerable information on how to fulfil the industrial dynamic needs.

Furthermore, Malaysian industries frequently complaints of mismatch between the skills required and those possessed by graduates (George, 2006, p.11; Ninth Malaysian Plan, 2006-2010). Were the skills imparted to the trainees were base on the requirement of the Malaysian industries as many employers complained

that they have to retrain newly graduates who do not possess the required skills. Hence, employers must also do their part to build upon the skills imparted by the public and private training institutions by providing job and industry-specific skills and not just complain of the inadequacy of training (Pillai, 1992, p.52). Therefore, it seems mandatory to conduct effectiveness of learning transfer of a training programme so that trainees can be tailored to apply what being learned at skills training institutions once at workplace. As a result, the mismatched between what being produced by skills training institutions and workplace requirements is minimised through effectiveness of learning transfer event.

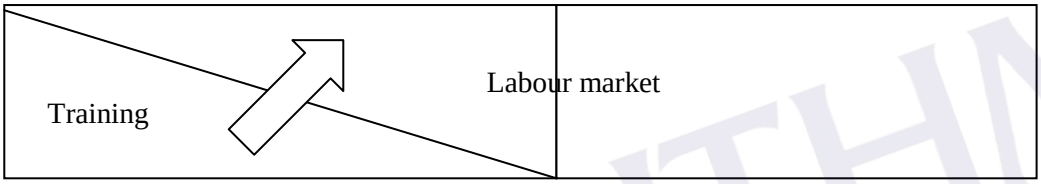

Figure 1.6: NDTS training with learning transfer prospect (Source: Gessler, personal communication, 2008)

Taking into account the complaints by the Malaysian industry of the poor skills training graduates performance at workplace, in the year 2005, the government of Malaysia has implemented the NDTS programme's to strengthen the technical, education and vocational skills training in the country. The basis of NDTS programme is that the trainee can experience a situation, debrief what has happened, reflect and learn from this and then transfer the knowledge and skills back to the workplace. The target is to produce the skilled workers who are hands-on, and who will fulfil the dynamics requirements of the industrial sector. Clearly, one very outstanding issue in Malaysia is that the effectiveness of the learning transfer in term of mismatch of knowledge and skills between what the trainees possess and what the industries expect.

The work process knowledge has become the central ideas of having learning transfer success in the modern world of work arrangement. The understanding of work process helps expedite trainees or apprentices adjusting themselves from learning environment to workplace situation. This means that the relevant work processes of the industry should be identified and must be included in the core of the curriculum so that effectiveness of learning transfer can be achieved.

Ultimately, curriculum with clear-cut work process orientation will definitely expedite effectiveness of the learning transfer.

In addition, to date most of the research on the training effectiveness of learning transfer in Malaysia has only focused exclusively on the Kirkpatrick's level 1 or reaction level (Loh 2004; Hashim, 2001). So far there has been little research identified on the learning transfer in Malaysia. For instance, Hashim (2001) found that about 88.3 per cent of training providers in Malaysia used mainly reaction measures to evaluate training effectiveness. The reaction measure to evaluate training effectiveness is mainly on the satisfaction level of the participants once after the training programme ended.

The NDTS programme had been introduced on the premise that the previous system had been considered failed to cope up with effectiveness of learning transfer from training to workplace. Thus, requires realignment of the way skills training operates that could deliver effectiveness of learning transfer from training into workplace. Hence, concerted effort need to be taken in order to ensure effectiveness of learning transfer did took place in any of the skills training programme especially, NDTS programme. Ultimately, this effort is in line with the objective of the Tenth Malaysia Plan of mainstreaming TEVT in achieving 50 per cent target of highly-skilled workforce by 2020 (Tenth Malaysian Plan 2011-2015).

1.6 Statement of problem

Although extensive research has been carried out into learning transfer matters worldwide, little is known about the learning transfer phenomena in skills training in Malaysia. Hence, this study is prudent to fill the issue and research gap. Since, there is a shortage of studies on effectiveness of learning transfer in Malaysia thus far; we do not know how effective the learning transfer is taking place in any of the skills training programme implemented. Much training in Malaysia has been deemed too theoretical with the knowledge and skills learned not being transferable to the workplace (Loh, 2004). For example, Awonyi, Griego, & Morgan (2002) estimated that only about 10 per cent of the skills and knowledge gained from training and education programmes actually are transferred into practice. In addition, Intergovernmental Studies Program Primer (2006) estimated that as little

as 10 to 20 per cent of the knowledge or skills taught in training programmes are effectively transferred to the workplace. This was due to what being taught at skills training institution curriculum does not match as per what being practiced in industry.

Furthermore, the existing curriculum cannot sustained the phenomenon of the steadily increasing complexity at the industry workplace and the accelerated pace of technological change. The requirement of workers with hands-on agility and capability within the industry scope of work is highly sorted. Therefore, new framework or model of learning transfer in skills training institutions must take place to cater the needs and have relevant to the Malaysian industry (Seng Kuan, 2008). Having this situation, experientially based programmes such as the Experience-Based Education and Training (EBET) or the German Dual Apprenticeship System, which is predominantly work process oriented became more popular in an endeavour to try to move away from too theoretical programmes such as the Competency-Based Education and Training (CBET) which is predominantly skills-assessment oriented (Loose & Juri 2008).

This study is to investigate the effectiveness of learning transfer from the trainees' perception during and after NDTS automotive mechatronics course training. All in all, the focus of this study is to determine the effectiveness of learning transfer among the automotive mechatronics course trainees of the NDTS training programme. In other words, the focus of this study is to identify and empirically test the learning transfer factors associated with NDTS programme. Thus, the uphill challenge is to identify what are the most significant factors and dimensions that contribute for the effectiveness of learning transfer as instructed by EPU (2006) in the Ninth Malaysian Plan regarding the skills and vocational training

In order to measure those dominant factors and dimensions the study seeks the relevant literatures and work of past researchers to underpin it. It was found that there is an instrument by the name of Learning Transfer System Inventory (LTSI) constructed by Holton et al. (2000), which is a questionnaire to measure the learning transfer factors from training environment context to workplace situation. In other words, the study ascertains whether LTSI is a valid diagnostic instrument to assess NDTS trainees' capacity to apply what they have learnt during training. However,

this instrument items has to be value added according to the NDTS context. This is important for the researcher's to generalise the use of the questionnaire and then to build a theory of learning transfer especially for the NDTS programme in Malaysia.

Acknowledging of how good is the actual effectiveness of the learning transfer that is shaping from the learning place to the workplace of the NDTS programme is also an important element of this study. Hence, this provides very important lessons and ideas of improvement for future NDTS programme.

1.7 Aim of the study

The aim of this study was to ascertain on whether the effectiveness of learning transfer did occurred in the automotive mechatronics of NDTS programme. The subjects under studies were the trainees of the NDTS automotive mechatronics course. The matter of how to achieve the aim of the study is elaborated in details under the topic of the scope of study.

1.8 Objective of the study

Generally, the objectives of this study were as follows:

i. To determine the dimensions of the effectiveness of learning transfer;
ii. To measure the effectiveness of learning transfer with an instrument;
iii. To understand the actual status of the effectiveness of learning transfer; and
iv. To propose the framework for effectiveness of learning transfer in NDTS.

1.9 Research questions

Specifically, this study will provide relevant information to answer the following research questions:

i. What are the dimensions of the effectiveness of learning transfer?
   In exploring the effectiveness of learning transfer in NDTS context, this study has focus on the existing literatures to underpin all the relevant dimensions regarding the effectiveness of learning transfer. Finding the

dimensions that facilitate the learning transfer is considered as the first step to understand NDTS programmes learning transfer phenomena.

ii. How is the effectiveness of the learning transfer from NDTS automotive mechatronics course to the workplace?

The researcher has determined the effectiveness of learning transfer by comparing the result collected from NDTS automotive mechatronics trainees during and after the training. Then, the researcher was interested in finding the answer with regard to what type of learning transfer occurred in NDTS and subsequently determined the correlations coefficients (r) and also testing the hypothesis to answer the sub-research questions that is to measure the strength and direction of linear relationship between a pair of variables. This enable the researcher to understand how the learning gained through NDTS automotive mechatronics course is transferred to the automotive workplace and effectively applied in practice. The sub-research questions were:

a) What is the different between trainee characteristics during and after NDTS automotive mechatronics training?
b) What is the different between course content during and after NDTS automotive mechatronics training?
c) What is the different between training delivery during and after NDTS automotive mechatronics training? and
d) What is the different between working tasks during and after NDTS automotive mechatronics training?

iii. What are the most influential dimensions contributing towards the effectiveness of learning transfer framework in NDTS automotive course?

By determining all the important dimensions subsequently, enables the researcher to establish the emergent framework of the effectiveness of learning transfer in NDTS. The need to set up a framework for NDTS learning transfer is growing more than ever.

1.10 Research hypotheses formulation

The focused research in this study is to measure the learning transfer dimensions in NDTS automotive mechatronics course. Hence, this section is dedicated to establish the appropriate research hypotheses base on questions derived from the theory postulated by extensive literature study and ultimately enable researcher to answer the No. 2 sub-research questions. Salkind (2006) suggests that hypothesis is a definite statement of the relationship between two variables and is considered an educated guesses and this sometimes are better than other guesses right from the start. Therefore, a complete and good written hypothesis tells what you are going to do not how you will do it. The following are some criteria guide for well-written hypothesis (Yahaya et al. 2007; Salkind 2006):

i. Is stated in declarative form not as question;
ii. Posits a relationship between variables;
iii. Reflects a theory or body of literature upon which it is based;
iv. Is brief and to the point; and
v. Is testable.

In order to answer the research question No.2 therefore, the research hypotheses have been developed based on the following literature support:

i. Hypothesis for Trainee characteristics

Trainee characteristics are one of the important variables having influence on learning transfer. Trainee age, gender, education, nature of training, nature of work and level of work could determine trainees' readiness or motivation to learn. Age, for example, could indicate levels of maturation or cognitive competency to comprehend new knowledge, or physical capacity to apply new knowledge, skills and attitude at work. Acceptance of change could be relevant to educational level, where the educated are more likely to gain more knowledge, retain, and apply it. In short, the demographics factors could determine the differences among trainees and influence their various levels of interaction with training. Daffron & North (2006) indicated that variable influence strongly successful learning

transfer is involved in the pre-programme planning process and self-motivation to participate. Based to this theoretical underpinning, the researcher first Null Hypothesis is: **Null Hypothesis 1:** There is no different between NDTS trainee characteristics during and after NDTS automotive mechatronics training.

ii. Hypothesis for Course content

Perceived course content validity has a significant impact on learning transfer back to workplace. The course content validity refers to the extent to which training course are judged by trainees as accurate reflections of the learning transfer goals and objectives of the course (Holton et al. 2000). Sharing similar finding Lim & Johnson (2002) stressed that without strong match between the training content and the trainee's workplace roles; it is unlikely that transfer will occur. Thus, the course content here represents the National Occupational Core Curricula (NOCC) used in NDTS automotive mechatronics course. On that basis, the researcher formulates the second Null Hypothesis as: **Null Hypothesis 2:** There is no different between course content during and after NDTS automotive mechatronics training**.**

iii. Hypothesis for Training delivery

Past studies have revealed that the primary instructional design issues that impact learning transfer include the principle of identical elements (Baldwin & Ford, 1988; Mestre, 2005), that is the relevance of the training delivery to the trainees job (Bates, Kaufeld & Holton, 2007). Yamnill & Mclean (2002) found that when practising exercises are similar to those which trainee encounter on a daily basis at work, the acquisition and learning transfer is more likely to improve. Moreover, the use of a variety of delivery approaches and involvement of the trainee in the learning process can also expedite learning transfer (Daffron & North, 2006). Given the evident of what instructional delivery design

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