

Learning Transfer Types in National Dual Training System in Malaysia

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ABSTRACT

Rapid development of technology has force Malaysia to change its skills training landscape to meet the dire need for the skilled workforce of today industries. Obviously, this wind of change evident is the shifting from competency-based training also known as National Occupational Skills Standard (NOSS) based system to National Dual Training System (NDTS). Thus, this paper aims at identifying what types of learning transfer exists in the NDTS programme. Hence, the types of learning transfer from training context to workplace environment were examined at two time phases (before and after NDTS programme). Moreover, the types of learning transfer were measured using qualitative data. The data was collected using interview questionnaires that were conducted on the trainees of NDTS three automotive industries. Measurement items were adopted and adapted from Learning Transfer System Inventory (LTSI), previous studies and expert group discussions. A longitudinal study method was employed as the research methodology. The participants of this research were the trainees from NDTS Mechatronics Automotive course. The study utilized the semi-structured interview. It was apparent that NDTS training programme appears to had facilitated the positive transfer and near transfer from training situation to workplace environment. Therefore, to maximize the outcome of learning transfer it is imperative that the NDTS trainees should be an action oriented learner during and after NDTS training programme. Apparently, trainees in this study had identified two types of the learning transfer that had occurred from training context to workplace environment which are positive and near learning transfer.

Article type: Research paper

Keyword(s): Learning transfer, learning transfer types, positive transfer, near transfer.

1.0 Introduction

Learning transfer is a key concept in any skills training because most formal training aspire it to occur. Research on learning transfer argues that very often transfer does not occur (Perkins & Salomon, 1992). In this section, the researcher has comprehended the views on learning transfer in order to show that a novel logical developmental of learning transfer in skills training has been rooted from several schools of thoughts. Basically, historical theories of learning transfer can be divided into two categories: those that emphasise the analysis of events external to the learner and those that emphasise the analysis of events internal in the learner. For this purpose, these categories of theories can be views as follows:

Firstly, according to behaviourist view on learning the connection and association must be established between the stimuli and response (S-R) for any learning transfer to occur (Thorndike & Woodworth, 1901). Since then, behaviourists always referred the learning transfer as S-R framework where learning is the result of associations between S-R. Such associations become strengthened or weakened by the nature and frequency of the S-R pairing (Morton 2006; Lobato, 2006; Barnard, 2005). The fundamental limitation of identical elements theory is that it has little to say about a number of learning transfer types. Obviously, behavioural theories had only stressed on learning transfer of skills and knowledge which much depends on the S-R situations at which could be regarded as aspiration towards near transfer. Hence, behaviourist theories is lacking of higher order thinking, problem solving and collaborative work skills (Doolittle & Camp, 1999). As a result, the cognitive revolution took hold in the later part of the 20th century through hypothesised events occurring in a learner's cognitive structure (Lobato, 2006; Mestre, 2005).

Secondly, the cognitive notion of learning transfer is based on the idea of that skills and knowledge is transferred from the solution of one task to the solution of another task (Konkola, Tuomi, Lambert & Ludvigsen 2007). According to cognitive theory of learning transfer was developed in the context of the presentation of ideas about how human cognitive system was structured and about how it functioned (Mestre, 2005). Put it in another way, contemporary social cognitive theorist emphasise the role of context in learning. In addition, the cognitive apprenticeship theory believed that the occupational competence is a key to the development of context-related expertise with work-related knowledge providing link between knowledge which is not context-related, and experience at work, which may not be necessarily be used in a generalisable way (CEDEFOP, 1998). Ultimately, to achieve cognitive learning transfer, it is necessary to teach explicitly and intentionally for transfer.

Thirdly, constructivist notion of learning transfer aspire that any training should focus on the general principles needed to be learned by trainee so that the trainee may use them to solve other problems through creative and innovative way. Hence, it is justifiable that the constructive view of learning transfer demands a new thinking set and new approach which is different from the classical cognitive and behaviour views (Marton, 2006). Thus, learning transfer is constructivist because 'old knowledge is always revised, reorganised and even reinterpreted in order to reconcile it with new input' (Lobato, 2006, p. 431; Macaulay & Cree, 1999, p.185). For that reason, constructivist aspire the near and far transfer to occur where trainees could applied their learned skills and knowledge at workplace no matter exists the similarity or different from the original learning tasks or contexts. Therefore, to differentiate between the learning transfers types found in literature, the following description is worth elaborated.

2.0 Reserach Purpose

Much training has been deemed too theoretical with the knowledge and skills learned not being transferable to the workplace (Loh, 2004). Devos et al. (2007) estimate less than 20 per cent of the knowledge and skills acquired in training are used on the job. In addition, Awonyi, Griego, & Morgan (2002) estimate that only about 10 per cent of the skills and knowledge gained from training and education programmes actually are transferred into workplace practice. Meanwhile, 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. In the other hands, the existing curriculum cannot sustained the phenomenon of the steadily increasing complexity at the industry workplace and the accelerated pace of technological change. Therefore, the study focus is to determine the types of learning transfer among the automotive mechatronics course trainees of NDTs training programme. In other words, the focus of this paper is to identify the learning transfer types associated with NDTs programme.

3.0 Literature Review

The literature has used various terms besides learning transfer, such as “transfer” and “training transfer”, to conceptualize the same meaning. Thus, terms “learning transfer” and “training transfer,” are perceived as interchangeable (Khasawneh 2006, p. 183; Khasawneh 2004, p. 8; Chen 2003, p. 47; Leberman 1999, p. 5). Learning transfer also defined as the generalization of the skills acquired during the training phase to the work environment and the maintenance of these acquired skills over time (Nikandrou et al. 2009; Baldwin & Ford, 1998; Elangovan & Karakowsky, 1999; Leberman 1999). In this study researcher have used the term Learning Transfer, because Learning Transfer best represents the desired outcome which is transfer of learning to actual job performance. Specifically, Holton (2000); Broad & Newstrom (1992) define it as: research undertaken in a variety of settings which identified a large number of factors that affect the learning transfer back to the workplace. According to Intergovernmental Studies Program Primer (2006, p.1) the word transfer comes from two Latin terms, *trans* (over or across) and *ferre* (carry). In general terms learning transfer occurs when prior-learned knowledge, skills and attitudes affect the way in which new knowledge, skills and attitudes are learned and performed. Transfer is deemed to be positive if acquisition and performance are facilitated, and negative if they are impeded following an identified period of learning related to an individual’s place of work, transfer is the process of applying knowledge, skills and attitudes acquired during a training programme to the work place. Their successful application leads to an improvement in job performance and has a lasting effect.

In this study, understanding of the differences in the types of learning transfer is important as to see on whether learning transfer occurs, and which forms does the transfer take. The ten types of learning transfer identified by Barnard (2005, p. 274) were:

1. **Positive transfer:** The extent to which trainees acquired knowledge, skills and attitudes which can be applied effectively in work practice;
2. **Negative transfer:** The extent to which trainees faced undesired effect after they attended a training course;
3. **Far transfer:** Transfer when the initial learning task and the subsequent task to be learned differ substantially;
4. **Near transfer:** Transfer when the initial learning task and the subsequent task to be learned differ only slightly or not at all;
5. **Low-road transfer:** Transfer based on intensive and varied training, and occurring by means of automatic use of knowledge and skills in a new context;
6. **High-road transfer:** Transfer based on consciously abstracting of already acquired knowledge and skills from one context to another;
7. **General transfer:** The trainee acquired certain working methods, knowledge, and skills, which can be used in tasks other than the original learning task;
8. **Specific transfer:** Learning tasks are so specific that no tasks transfer is expected;
9. **Horizontal transfer:** Transfer from one task to another; and
10. **Vertical transfer:** Transfer within a certain task, with growing expertise.

Interestingly, Taylor et al. (2009); Mestre (2005) described learning transfer as the experience or performance on one task that influences on some subsequent task. All in all, learning transfer can take three forms (Intergovernmental Studies Program Primer, 2006) that are: (i) Positive transfer in which performance on one task aids a second task; (ii) Negative transfer when one performance inhibits the other; and, (iii) Zero transfer in which no effect occurs. Mestre (2005) also discussed near transfer occurs when the learners apply the knowledge and skills in situations or contexts that are very similar or identical to those in which the learning occurred.

4.0 Research Methodology

The instrumentation relied on a questionnaire to generate quantitative data for analysis. Participants were asked voluntarily to complete the Learning Transfer System Inventory (LTSI) at two different time phases; during and after the NDTs training duration (during employment). The construct-validated instrument (Holton et al. 2000), consists of a pool of 89 items designed to measure 16 factors affecting learning transfer. Scales developed to measure these 16 constructs yielded exceptionally clean loadings interpretable factors. It is also said to be one of the robust transfer system assessment instrument ever developed (Ruona et al, 2000 p.222). Furthermore, Khasawneh (2004), Chen (2003); Yamnill and McLean (2002) have validated it in their research studies in Jordan, Chinese Taiwan; and Thailand respectively.

i. Population and sample

The total population of trainees that currently undergoing the NDTs programme were 55 people. Thus, sampling design for the trainees was a double sampling method where the same sample is studied twice, thus offers more detailed and meaningful information on the effectiveness of learning transfer from learning environment to the workplace situation. In addition, the interview sessions with the trainees were the purposive sampling which involved sample size of 15 trainers.

ii. Data collection and Analysis

Data collection was in term of longitudinal-study surveys approach that is during the training and after the training (approximately 3 months after completion of NDTS/during employment). The primary data was gathered directly from the survey subject. Meanwhile, for the secondary data the researcher gathered it from the literature study, journal articles, books, reports etc. Then, the data collected was analyzed by appropriate test from NVivo softwares.

5.0 Results

The total of 15 trainees from the total of 55 NDTS first cohort has participated in the interview session. The respondent consists of trainees from three NDTS automotive mechatronics course companies namely; (i) Mercedes Benz (M), (ii) Tractors (M) and (iii) NAZA Manufacturing. Since types of learning transfer could not be measured exactly or quantified precisely therefore, the researcher had sought concrete evidence from the qualitative data analysis. The findings of the study revealed that:

What type of learning transfer occurred in NDTS?

The researcher had determine the types of learning transfer by comparing the interview result collected from NDTS automotive mechatronics trainees during and after training. This has enabled the researcher to understand how the learning gained from NDTS automotive mechatronics course is transferred to the automotive workplace and effectively applied in practice. The very meaningful findings and insights could be drawn from this study results were; with regarding to the differences in mean scores between during NDTS training (Time 1) and three months after NDTS training (Time 2), uncovered that there were no significant different at both times. In other words, there were similar pattern at both time phases. Equally important, trainees perceived the course content during and after are similar and identical. This result suggests that prior acquisition skills and knowledge through NDTS course content could be applied to the subsequent workplace because there is connection between source of training and actual job. Lesson learned in NDTS classroom showed coincidence with opportunities for trainee immediate application in the service centre/branches placement. Hence, the field experiences the trainees exposed to seem much related directly to concurrent NDTS course content. This presumes that successful learning transfer includes acquiring the ability actively to apply lessons from one setting to another. Therefore, most NDTS service branches/centres sites have areas of particular strength which complement the classroom curriculum and lend trainees readily to reinforce the learning transfer back to workplace.

Besides, trainees perceived during NDTS training seemed to be influenced by their immediate training needs. Meanwhile, their perceived application three months after NDTS training was found to be influenced by their immediate workplace needs. In particular, it seemed that the instructional methods used at both during and after NDTS training were almost identical. Furthermore, trainees perceived there is a difference between working tasks during and after NDTS automotive mechatronics training. At this juncture, the trainees having the opinion of that the differences between working tasks at actual workplace during and after training exposure

differ at two time phase due to that both environments (during and after) although share similar characteristics but it was actually comprises of two different set-up situations.

As have been said, enough evident from trainees and coaches feedbacks were gathered in term of each NDTS trainee is sent in and out the services branches/centres just to acquire the actual working tasks. However, once trainees finished NDTS programme and are place on full employment (after NDTS training), surely their perceptions will be changed due to the influenced of the industry and work contexts. In addition, the most critical influence of this perceptions change is believed to be attributed by the actual workplace requirements which are very dynamics because of the fast changing work processes and technological developments.

Since the major goal of the skills training is to facilitate positive transfer and to minimise negative transfer. The following discussion is related to does learning transfer occurs and in what form the transfer takes place in NDTS programme. According to results of the earlier focus group discussions given by NDTS trainees, it was crystal clear that much of learning transfer has occurred. Nevertheless, the actual amount of learning transfer could not be determined precisely (quantitatively). Thus, the researcher had utilised the qualitative evidence to support the learning transfer phenomena. In addition, the researcher is claiming that for most trainees, the two types of the learning transfer that had occurred were positive transfer and near transfers. Basing on this premises and evidence, the learning transfer type found were positive and near. Therefore, for each type of learning transfer, the researcher provides argument on why some types of transfer occurred while the other types did not:

(a) Positive transfer: As already illustrated, trainees most frequently mentioned positive transfer events, claiming that their initial learning in NDTS training setting enabled them to complete their workplace tasks effectively. Hence, the first type of learning transfer examined and found here was positive transfer. Positive transfer can be described as the extent to which trainees acquired knowledge (cognitive domain), skills (psychomotor domain) and attitudes (affective domain) or KSA which can be applied effectively in work practice. Effective use of KSA is the key trait of the positive transfer. The study result suggest that positive transfer occurred due to what is learned during NDTS training (acquisition phase was similar to workplace application). Evidently, for most NDTS trainees, there were ample opportunities to use the KSA learned and so it is quite safe to rule in the existence of effective use and thus conclude that positive transfer did occurred. A sample from unanimous trainee's perception about positive transfer:

T1 (D): We also performed engine pressure testing, compression testing, dry test and wet test to ascertain whether there is the need for top overhaul or general overhaul to the car engines. Training learned is meant to be utilised at the workplace. So putting what is learned in training at workplace shows our commitment and seriousness in maintaining quality of work (T1, focus group).

(b) Negative transfer: The second type of transfer is the negative transfer or the extent to which trainees faced undesired effect after they attended a training course. Since, it has been concluded that positive transfer has occurred; it means that the opposite type i.e. negative transfer did not occurred. Undoubtedly, there has been no evidence on any undesired indicators for during and

post-training effect on the trainees. Therefore, it can be safely stated here that there was no negative transfer effect on the NDTs automotive mechatronics course.

(c) Far transfer: The third type of transfer is far transfer or the type of transfer that occur when situations involving the initial learning task and the subsequent task to be performed differ substantially. Apparently, this has been explained in the previous section from the trainees perspective of the automotive mechatronics course has not indicated the learning transfer design deficiency. The inclusion of course content, training delivery and working tasks showed that there was no significant difference between initial learning task and subsequent task. For this reason, the researcher believes that far transfer did not occur in NDTs programme.

(d) Near Transfer: The fourth type of transfer is near transfer or the type of transfer that occur when the initial learning task and the subsequent task to learn differ only slightly or not at all. As already illustrated, trainees most frequently mentioned near transfer events, claiming that their initial learning in training setting resembled the workplace tasks thus enabled them to complete their workplace tasks easily because the similarity of the training tasks and workplace tasks. Definitely, it is quite obvious that initial learning task and subsequent task did closely resemble one another (during and after NDTs training) and thus, it can be concluded that near transfer did occurred in NDTs automotive mechatronics course. A sample from unanimous trainee about near transfer:

T2 (N): Usually the actual parts or components being used by the coaches at training such as actual motor, pump, valve, brake system, wheel alignment machine, engine cut-off model, real battery, real viscosity of SAE engine oil charts and diagrams, real airbag, lighting system, gearbox etc. (T2, focus group).

(e) Low-road transfer: The fifth type of transfer is low-road transfer or transfer based on intensive and varied training, and occurring by means of automatic use of knowledge, skills and attitude in a new context. Research findings show that there was no clear intensive and varied training practices by trainees until the skills become automatic. However, considering that the research is carried out at two time phases during and after NDTs programme, perhaps certain elements such as further training and on-going performance assessment should be in place to determine the existence of the low-road transfer. Therefore, low-road transfer can be ruled out.

(f) High-road transfer: The sixth type of transfer is high-road transfer or transfer based on conscious abstraction of already acquired knowledge and skills from one context to another. For most trainees, high-road transfer did not happen. There was no evident or incident involving element of the high-road transfer. Based on what trainees learned during and after the automotive mechatronics course, the trainees' informed, there were no activity with regard to service and repair method different to what they are using at workplace. This appears to be evidence on the non-existence of high-road transfer.

(g) General transfer: The seventh type of transfer is general transfer where trainee acquired certain working methods, knowledge and skills, which can be used in tasks other than the original learning task. The NDTs automotive mechatronics course was work process based training in nature, thus it successfully had helped the trainees to understand the mechanism behind automotive vehicles service and maintenance system at large. Hence, the NDTs learning

and training were not meant for general transfer but for near transfer. Therefore, the researcher is very confident that NDTS automotive mechatronics programme serves specifically for the near transfer rather than just merely general transfer.

(h) Specific transfer: The eighth type of transfer is specific transfer or the type of transfer containing learning tasks that are so specific that no tasks transfer is expected. This is especially not true for the NDTS automotive mechatronics course investigated. Due to the in-depth nature of the automotive mechatronics where the course content, training delivery and working tasks were the focal elements, thus this is meant for the near transfer rather than specific. Therefore, specific transfer can be ruled out.

(i) Horizontal transfer: The ninth type of transfer is horizontal transfer or transfer from one task to another at a sequential manner. This horizontal transfer or lateral transfer includes what is commonly thought of as application, which is the ability to apply in practise what one has learned in sequence from the training institution to workplace. The three industries involve in this research study have shown not to have the same learning sequence. The attachment of trainees in and out at various service branch/centre throughout the country indicated that their mode of learning transfer were not sequential but rather mixed. Therefore, there is no clear evidence of this type of transfer occurring based on the findings of this research.

(j) Vertical transfer: The tenth type of transfer is vertical transfer or transfer within a certain task, with growing expertise. In other words, learning is thought to be hierarchical in nature, ranging from simple forms of learning behaviour to more complexes, higher order behaviours. Even though, NDTS trainees were exposed to multiple-tasking based on work process at the respective service branches but, according to coaches, the trainees need more time and exposures to gain expertise. This means that the lower-order learning must precede higher order learning in the hierarchy. Therefore, there is also no clear evidence of this type of transfer occurring in NDTS programme.

In particular interest, the very important fact that can be drawn from this research study is that this study provides convincing evidence that learning transfer activities has a meaningful impact on improving trainees performance results achieved from NDTS training. Therefore, learning transfer is always specific and occurs as a result of previous encountered situations.

6.0 Discussion and Conclusion

The following finding is related with regard to does learning transfer occur and in what form does the transfer take place in NDTS programme. Based on feedbacks given by NDTS trainees, it was quite clear that much learning transfer occurred even though the actual amount of transfer could not be determined precisely. Based on the findings of this study, the researcher claimed that for most trainees and trainers, the two types of transfer that occurred were positive transfer and near transfers.

(1) Positive transfer: The first type of transfer examined here is positive transfer. Positive transfer can be described as the extent to which trainees acquired knowledge (cognitive domain),

skills (psychomotor domain) and attitudes (affective domain) or KSA which can be applied effectively in work practice. Effective use of KSA is the key trait of the positive transfer. For most NDTS trainees, there were ample opportunities to use the KSA learned and so it is quite safe to rule in the existence of effective use and thus conclude that positive transfer did occur.

(2) Near Transfer: The fourth type of transfer is near transfer or the type of transfer that occur when the initial learning task and the subsequent task to learn differ only slightly or not at all. It is quite obvious that initial learning task and subsequent task did closely resemble one another (during and after NDTS training) and thus, it can be concluded that near transfer did occur in NDTS automotive mechatronics course.

In summary, the industry specific practices of work processes offered by NDTS training programme has been seen as catalyst that facilitate positive and near learning transfer at both stages during and after training so that graduates could easily being absorbed into employment. Interestingly, the learning transfer of skills, knowledge and attitude (KSA) is integral to our skills training aspirations and expectations, most of the NDTS trainees believe that many aspects of what they have trained in NDTS programme benefited them later in working life.

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