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Abstract

Training has been regarded as an expensive investment where organizations spend exurban amount of money annually on training, yet little of this investment could lead to positive transfer result. So far, most trainers still use conventional training approach and without properly addressing the transfer of training issues which led to a costly and timely effort; therefore it is unable to deliver the expected result. Consequently, the study on the transfer of training has generated significant interest among educators and practitioners. The purpose of this paper is to provide critical review on the relevant literature on transfer of training. It also suggests a conceptual framework that integrates trainee’s individual characteristic, as major factors that may influence the transfer of training. In addition, the literature of Activity Based Costing (ABC) implementation will be examined to demonstrate these relationships and in understanding the process of transfer of ABC training. The study also proposes future research strategy which aims to seek understanding of the experience of trainees undergoing the process of transferring the ABC training and to explain how major individual factors influence this transfer. The proposed research strategy aims to add another dimension of the present transfer of training literature and to extend the scope of Activity-Based Costing study.

Keywords: Transfer of training, factors influencing transfer, individual characteristics, Activity Based Costing.

1.0 Introduction

The importance of manufacturing sector as the backbone of Malaysia’s economic growth should not be overemphasized. For example, the new jobs created during a period amounted to 853,700 jobs, as compared to trading, hotel and restaurant combined which only 810,400 jobs \cite{1}. Hence, the effort to study and provide educational support to manufacturing sector can be viewed as a significant contribution to the economic growth of the country. As most manufacturing companies are facing greater challenge to stay competitive, they have to embark in various process improvement initiatives such as TQM, lean manufacturing, JIT, CIM and MRPII. Yet, other aspect of profitability: cost, which is becoming a significant factor for long term success of any company, has not been given adequate attention. Fortunately, innovation in the field of management accounting had led to the development of a recent cost improvement tool called Activity Based Costing (ABC) which is able to help companies in process improvement and decision making. Certainly, professional staffs such as graduate engineers who work in manufacturing organizations need to be effectively trained with ABC competency.

In conjunction with the need to train engineers with ABC competency, the question arises whether these trainees are able to transfer the training they received back to their work place. Admittedly, training has been regarded as an expensive investment where business organization spent exurban amount of money annually on training, yet little of this investment could lead to positive transfer result. Consequently, the issue on enhancing the transfer of training has generated significant interest not only in developed countries, but also in developing countries such as in Malaysia. So far, educators, trainers, and practitioners involved in ABC training still use conventional training approach, which normally do not properly address the transfer of training issues which led to a costly and time-consuming effort as it failed to deliver the expected result. Therefore, there is a critical need to identify and describe factors that influence the transfer of training and also to deeply understand their inter-relationship to each other.

2. Relevance Issues of Transfer of ABC Training in Manufacturing Companies
Accepting training as a practical solution to equip engineers in manufacturing companies with ABC competency, another related concern arises on how to ensure the effectiveness of this training in terms of the extent of transfer back whatever the trainees have learnt to the work place. The concern is justified, since most organizations regarded training as an expensive investment where they spent exurban amount of money annually on training, yet little of this investment could lead to positive result. To quote one example, researchers estimated that in the United State alone, companies spent approximately $100 billion annually on training programs, yet only 10 percent of total training costs lead to positive transfer results [2]. Consequently, this phenomenon has generated significant interest in the issue on enhancing the transfer of training especially in manufacturing companies, which are considered the most important industry for the Malaysian economic.

2.1 ABC Practices in Manufacturing Companies

Even though there had been increasing interest in the application of better costing system such as ABC in manufacturing companies [3], yet the interest has only developed drastically in mid-1980s due the introduction of “Relevance Lost: The Rise and Fall of Management Accounting”, which highlighted the problem faced by most manufacturing companies [4]. In the introduction page, the authors provide a very strong statement to describe the problem faced by companies:

“Today’s management accounting information, driven by the procedure and cycle of organization’s financial reporting system, is too late, too aggregate and too distorted to be relevant for engineers’ planning and control decision”

(Johnson, H. J. and Kaplan, R. S., 1987, pp.1).

In another perspective, Evans and Lindsay [5] pointed out that is important to manufacturing companies today to understand and apply one determinant of profitability: cost. Indeed, the authors believed that ability to obtain and use accurate and timely cost information has becoming more urgent effort for long run success of any company to attract potential customers or to retain the loyalty customers in purchasing and using of products. Unfortunately, most manufacturing companies still using the traditional costing system, which is based on labor-intensive production system, and unable to serve the present need of manufacturing companies [6]. Fortunately, this problem was clearly voiced out and a possible solution has been addressed by a management teacher and thinker [7]:

“Traditional cost accounting in manufacturing – now seventy-five year old – does not record the non-producing, such as the cost of faulty quality, or of the machine being out of order, or of needed parts not being on hand. Yet these unrecorded and uncontrolled costs in some plants run as high as the costs that traditional accounting does record: By contrast, a new method of cost accounting develop in the past ten years – called ‘activity-based’ accounting – record all costs. And it related them, as traditional cost accounting cannot, to value added. Within the next ten years it should be in general use. And then we will have operational control in manufacturing”

(Peter Drucker, Managing in a Time of Great Change, 1995, pp. 101)

For the discussion of this paper, the definition of ABC provided by the Consortium of Advanced Manufacturing-International (CAM-I) will be used. CAM-I defined ABC as a methodology that measures the cost and performance of cost objects, activities and resources. Cost objects consume activities and activities consume resources. Resource costs are assigned to activities based on their use of those resources, and activity costs are reassigned to cost objects (outputs) based on the cost objects’ proportional use of those activities. Activity-based costing incorporates causal relationships between cost objects and activities and between activities and resources [8]. Similarly, using the process perspective, Goldstein, I. L. [9] views ABC that traces costs to products and services in two steps or distinct levels, (1) overhead costs are identified with homogeneous activity-based cost pools and (2) pooled costs are applied to products using measures of activities consumed.

As a financial information system alternative to traditional costing, Activity Based Costing (ABC) can provide financial and non-financial information to measure the cost of each activity in production and in supporting activities to produce and deliver of the product to customers [10]. Since ABC method has the advantage to provide more accurate product costs, implementing ABC method will help companies improve their operational performance [11]. Furthermore, a recently refined method of ABC analysis, which is called “Time-Driven Activity-Based Costing (TDABC), claims to be an easier and more powerful approach to be implemented [12].

2.2 ABC Training For Engineers in Manufacturing Companies.

Realizing many benefits gain from implementation of ABC, many companies have embarked in applying ABC system. However, these companies encountered many problems and barriers during ABC implementation phase, which
made some of them, have decided to abort ABC system, whereby they were unable to exploit its advantages. Krumwide [13] stated that one of the reasons behind unsuccessful implementation of ABC can be traced to the lack of knowledge, skill and attitude to carry out the ABC implementation from the beginning to the end. Another reason described by researchers on the lack of ABC success was the issue of ownership in implementing ABC which should not be lead by accounting personnel; instead the author suggested letting technical staffs who deals with operational aspect of manufacturing practices such as engineers who work as section or department heads in manufacturing organizations to lead ABC implementation. Since graduate engineers who work in manufacturing companies are normally identified as Industrial/production engineers and they are trained in or practice operations management, systems/production/manufacturing engineering, or systems engineering, therefore they are the most suitable candidates to take ownership responsibility in implementing ABC.

Issues that are critical to engineers in manufacturing organization are productivity, cost and quality. Specifically, roles of engineers at the operational level of a manufacturing organization include (a) administrative work involving operation staffs such as employment, rank advancement and resignation (b) task related to accounting such as budgeting, procurement and inventory (c) physical plant operation such as maintenance and renovation (d) develop a training system for their subordinates and (e) staffs welfare [14]. To ensure engineers perform these duties effectively in defining, monitoring and controlling manufacturing cost, Chang [14] specifically mentioned that engineers need to be trained on how to implement ABC as an improvement tool, so they can learn and effectively transfer ABC training.

To understand management works responsibility for graduate engineers, we should seek some explanation on management term. The ‘management’ is referred to a group of managers at various levels, from the chief executive officer of the company down to first-line heads, which normally represented by functional manager, department or section head and group leader. Malaysian Institute of Management [15] describes Malaysian management with three levels of hierarch, namely, top management, middle management and first-line or supervisory management. The top management concerned with the vision and the long-term objectives of the company, while middle management generally involved in planning, control and organizing resources, besides attending to meetings, paperwork, reports and so on. The lowest level of managerial work is line leaders or supervisors, responsible for specific teams or the lowest level of work groups, namely ‘operator’. For this research, the researchers define a graduate engineer as a technical person who has engineering degree and specific technical knowledge and skill, given responsibility or authority to make operational decision on implementation of a specific task, project, or program, and are accountable for the results of his unit, section or department they assigned for.

Graduate engineers normally work in middle or lower management provides the bridging role between upper management and their subordinates, as well as involved in planning and decision making at the operational level. Therefore, to be effective and efficient, graduate engineers should have some management knowledge and skills. They should learn some skill such as time management, work habits, people-related skills and use of decision support tools as ABC. Based on the study on ABC related studies, Chang [14] has strongly suggested the need for graduate engineers to learn and to be trained to practice ABC in their workplace. To quote his words;

‘All engineers should learn to practice ABC, because the traditional method of allocating overhead uses only high-level information about costs, and the general ledger system does not provide information related to time and resources spent on assignments and activities. In contrast, a well-practiced ABC method offers specific insight that include (a) a clearer picture for management of what generates profits and losses for companies, (b) the ability to tract operating profits for specific cost objects (such as customers, orders, and products), (c) the ability to determine whether a service center is efficient or deficient, and (d) the possibility to externalize the relative profitability among products and customers’

(Chang, C. M., 2005, pp.146)

Accepting the ABC training need for engineers, consecutive issue is to effectively plan and conduct training. In order to ensure the positive transfer what has been learnt in classroom to workplace environment, educators and trainers who involve in ABC training require proven methods or empirical supports to guide them. However, to the researchers’ best knowledge, the transfer of training aspect of ABC training, are virtually non-existence, yet most of current and previous ABC studies were concentrated on the area of adoption of ABC in workplace [13,16]. Since no framework is yet available to date to guide ABC training efforts and to provide valuable help to training practitioners, further study to understand the nature of transfer of ABC training as well as issues related to factors influencing the transfer of ABC training are important areas of research and will fulfill the current gap in the
3. Transfer of Training

In relation to the previous transfer of training studies, it should be noted that, most of transfer of training studies can be traced to Human Resource and Development (HRD) discipline. In fact, Broad and Newstrom, [17] stated that either HRD model or the more academic instructional model is still lacking a research base and therefore also restricted. In addition, up to the last decade, Haskell [18] pointed out that transfer of training study is virtually non-existent particularly in academic instruction or in research which aimed to understand transfer phenomenon as well in identifying factors to facilitate transfer. Hence, to precede the discussion, this paper borrows the HRD definition and defines transfer of training as the application of knowledge, skills and attitudes learned from training on the job and subsequent maintenance of them over a certain period of time [19]. On the other hand, literature also used transfer of learning interchangeable in order to illustrate more from a knowledge base and generic competencies; however both terms relate to learning and originate from the domain of pedagogical psychology [20]. Therefore, for the purpose of this discussion, both terms do not mean any fundamental difference.

3.1 Transfer of Training Model

Until recently, the most quoted transfer of training model is based on the model developed by Baldwin and Ford [19] as shown in Figure 1. According to this model, which was based upon research in the behavioral sciences, adult education and personnel administration, transfer of training is viewed as a system that consists of (1) training inputs – trainee characteristics, training design and work environment (2) training outputs – learning and retention of the training and (3) conditions of transfer – generalization what is learned and maintenance of the transfer behavior. Baldwin and Ford model [19] examined three training input factors; characteristics of the trainee, the training program and the work environment, those may influence the extent of transfer of learning to the work environment. The model may also provide insights into the identifying and understanding the inter-relationship of these factors that may supports or create barriers to the transfer of training.

![Figure 1: Baldwin and Ford’s Model of the Transfer Process][1]

However, Baldwin and Ford [19] model does not clearly describe the nature of transfer in details. Even though Kirkpatrick’s four levels training evaluation framework [21] describes of training evaluation into (1) reaction; (2) knowledge gained or skills acquired; (3) behavioural change and (4) results, this framework is viewed more toward providing a taxonomy of training assessment rather than training transfer model[22]. In the effort to better describe the transfer of training, Holton [22] proposed Learning Transfer System Inventory (LTSI) which aims to provide more comprehensive transfer of training model. However, Haskell’s transfer of learning framework which was developed using the educational approach seems to provide more comprehensive descriptions of transfer. The framework consists of two taxonomies for transfer of learning (1) to inform us when, how, and where transfer occurs using six levels of transfer – nonspecific, application, context, near, far and creative transfer and (2) to inform us five difference types of cognitive knowledge being transferred – declarative, procedural, strategic, conditional, and theoretical knowledge; and also fourteen specific kinds of transfer involved – content-to-content, procedural-to-procedural, declarative-to-procedural, procedural-to-declarative, strategic, conditional, theoretical, general (nonspecific), literal, vertical, lateral, reverse, proportional and relational transfer [18].

3.2 Measurement of Transfer of ABC Training

ABC research literature was very much less emphasized on the education or specifically on transfer of training issues, but has so far been focused more into the area of implementation and diffusion studies [23]. However, viewings from ABC perspective, learning from ABC training may be related to trainee clearly understand the
objectives and ways to implement ABC [10]. It can also mean trainee’s ability to understand and develop skills on how the ABC system works [24]. In term of application, actual training transfer may be viewed through of the ABC implementation framework perspective, which describes the process into six basic steps – initiation, adoption, adaptation, acceptance, reutilization and infusion or may be extended into a more refined framework that breakup the diffusion process into ten stages [13]. For example, maintenance of transfer of ABC training can be viewed as to keep the ABC costs data up to-date and to monitor ABC project through evaluation of ABC project progress from time to time [25]. Maintenance can also be viewed as the trainee does regularly review as any changes take place within the organization and in the marketplace [10].

According, examining Haskell’s framework that consists of two taxonomies for transfer of learning can provide much more detail explanations [18]. The first taxonomy is to inform us when, how, and where transfer occurs using six levels of transfer – nonspecific, application, context, near, far and creative transfer. Inferring to transfer of training model as described by Baldwin and Ford [19], level 1 to 3 – nonspecific, application and context transfer can be classified only as the training output (learning or initial application of learning and retention), while level 4 to 6 – near, far and creative transfer may be considered as the condition of transfer (generalization and maintenance) [19]. The second taxonomy is to inform us on five difference types of cognitive knowledge being transferred – declarative, procedural, strategic, conditional, and theoretical knowledge; and also fourteen specific kinds of transfer involved – content-to-content, procedural-to-procedural, declarative-to-procedural, procedural-to-declarative, strategic, conditional, theoretical, general (nonspecific), literal, vertical, lateral, reverse, proportional and relational transfers [18]. Similarly to infer the transfer of training model using Baldwin and Ford model [19], declarative knowledge in essential for learning to occur, while the rest – procedural, strategic, conditional, and theoretical knowledge all are needed to facilitate transfer. Using Haskell’s taxonomies, the process of transfer of ABC training could be described through identifying transfer status that can be related to steps of application and progress as described by ABC framework.

3.3 Factors Influencing Transfer of ABC Training.

Referring to Baldwin and Ford model [19], the training input factors that can influence transfer of training are (1) characteristics of the trainee; (2) the instructional program and (3) the work environment. Basically, this model describes the direct-one way relationship of these factors to the training output (learning and retention) and to the transfer (general and maintenance), however, Baldwin and Ford did clearly describe how these factors interacts to influence transfer [26]. Based on this model, researchers have studied some of these factors in detail, however, the most heavily research area was the design factors and limited literature was found on the effect of individual trainee’s characteristics and external factors such as environmental factors [27]. Moreover, Baldwin and Ford [19] stated that only the characteristics of the trainee and the work environment factors may have a direct influence on the ability to transfer. Elangovan & Karakowsky [26] has also proposed the effect of two factors model consists of individual factors and environmental factors. This paper will limit the study to focus only on individual trainee characteristics, which are believed to be the major factors that influence the transfer of ABC training. Although individual trainee factors have been known to influence transfer, the role of key variables in this category in affecting the transfer still received relatively little research work [26]. Therefore, by examining the relevant literature on factors influencing ABC implementation; this paper will clarify how individual factors influencing transfer of ABC training and to provide some indication of inter-relationships between those factors in influencing the transfer of ABC training.

3.4 Trainees Characteristics Factors

Researchers have classified trainee characteristics into six factors (1) trainee ability, skills and readiness to learn & apply and aptitude; (2) trainee motivation; (3) trainee self-efficacy; (4) trainee job attitudes and commitments; (5) personality, interest, expectations; and (6) goal-orientation [20, 28]. First, trainee ability refers to general capacity of trainee to demonstrate high performance for set of tasks given, which include cognitive and physical ability to acquire knowledge and identifying situation [26], while trainee aptitude refers to trainee readiness to be trained and later performs the transfer [29]. Second, motivation was proposed to have a direct relationship with continuous-learning culture [29] and also to training performance and perceived transfer [26, 30]. Trainee motivation may determine whether trainee can fit and adapt with their organization and later transfers the training [31]. Furthermore, motivation is found to has relationship to other factors such as perceive relevance of training material, choice in attending training, outcome expectancies, self efficacy and job involvement [26]. Third, Self-efficacy refers as trainee own judgment of his/her ability to perform tasks [32], which suggested that trainee who has high level of self confidence generally performs better [33]. Finally, other three factors – trainee job attitude
and commitments; personality, interest, expectations; and goal-orientation may have direct and/or indirect effect to motivation to learn, learning and transfer. Therefore, goal setting can be designed as a post-training intervention to facilitate transfer [34].
As previously mentioned, literature related to ABC implementation were virtually silent about influence of individual factors for successful ABC implementation. However, by examining relevant issues and factors related to successful implementation of ABC, this effort will still provide further understanding on factors influencing transfer of ABC training. Referring to ABC literature, it was found that most of factors can only be categorized as external factor that may directly or indirectly influence individual trainee characteristics. First, a factor that may influence transfer of training is leadership quality of trainee, which is required in order to introduce ABC method as new manufacturing concepts [24]. Leadership may be viewed as trainee is assigned to lead an ABC team, instead of only become part of member of the ABC team. Specifically stated, leadership can be identified with the appointment of the trainee as the ‘champion’ in an ABC project [35]. Second, another individual related factor mentioned in ABC literature that may links to trainee motivation is value and attitude of trainee, such as trainee shares similar values and attitudes within organization and easy to get cooperation from organization’s member on ABC project [10]. The third is job related variables such as time availability for trainee to implement the transfer of ABC knowledge and skills in workplace [10]. It can identify whether trainee’s job scope entitle him/her to obtain relevant information from organization’s database to conduct detail analysis, which is not normally available from the present system [36, 37]. Finally, trainee’s personnel communication, which can be viewed whether trainee be able to receive constant feedback from his/her top management and lower level employees on ABC implementation may affect the transfer of ABC training [11].

4 Future Work

In the study of emerging trends of transfer research, Subedi, B. S. [20] proposed four independent areas of transfer of training research – methodology and measurement of transfer; what and how factors influencing transfer; development of conceptual model for organizing knowledge about transfer; and development of educational technology to translate and apply solution for transfer. Besides, based on the researchers’ best knowledge, most of transfer of training studies so far, were very much independent and lack of integration. Hence, we propose a more comprehensive and integrated research strategy which can explore and describe the transfer process and also to understand how relevant individual factors may influence the transfer of training. We choose the specific training intervention using Activity-Based Costing training programme, that will be employed to train graduate engineers in manufacturing companies. For the initial work in the next phase of the study, a conceptual framework which integrates all relevant factors that have been discussed in this paper will be constructed. This framework will be based on Ford and Baldwin transfer of training model [19], Haskell’s taxonomies of transfer of learning [18] and Activity-Based Costing implementation framework.

Accordingly, using the conceptual framework to be constructed, the study will investigate the influence of individual trainee characteristics on the transfer of ABC training using qualitative methodology in order to explore how research participant act and react, take actions or engage in process of transfer of training received by them as well as to identify and describe what and how individual trainee characteristics will influence the transfer of training on graduate engineers in manufacturing companies. This proposed study will uncover meanings that trainees (graduated engineers) assign to their experiences and how and why such individual trainee characteristics influence the transfer process as the trainees goes through to transfer what they learnt from ABC training to their workplace. There are four specific objectives of research; (1) to explore and describe the training transfer status; (2) to identify individual trainee characteristics that influence transfer of ABC training; (3) to understand inter-relationship between each key variable that influence the transfer of ABC training; and (4) to build a substantive theory that will describe the transfer process and how the inter-relationship between key variables of individual trainee characteristics that influence the transfer of ABC training. Eventually, outcomes of the proposed study aim to extend the transfer of training body of knowledge and add a new dimension to the current ABC literature. Even-though this exploratory study will focus on a small group of participants in order to provide in-depth findings of the study area, yet the findings have wider implications and could be transferable to other similar setting in other manufacturing companies. Thus, the findings are expected to provide more comprehensive guides for educators and trainers on planning and implementing trainings that are able to produce effective transfer results, specifically to ABC training programme for graduate engineers in manufacturing organizations.

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