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The Effects of Mobile Learning Factors and Training Transfer on the Effective Organisational Learning in Malaysian Oil and Gas Industry

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Abstract Adoption of mobile learning (m-learning) is not new in Malaysian oil and gas industry, with heavy investment into research and development to train the workers. Nevertheless, the low application of learnt skills on the job remains an emergent research area where there is a missing link on the effects of m-learning and effective organisational learning and implication on its training transfer. The result of this quantitative research revealed that all variables in m-learning were found to have a positive relationship with the effective organisational learning, and there is evidence of training transfer as a mediator of the relationship between self-directed learning, training design, work environment and effective organisational learning. However, there were some discrepancies in the extend of training transfer between trainee characteristics and organisational learning. As such, some important issues emerged which challenge the importance of evaluating workers' readiness and transfer for a successful implementation of m-learning towards developing effective organisational learning.

Keywords Mobile learning, self-directed learning, training design, effective organisational learning, trainee characteristics, work environment, training transfer, learning organisation

I. Introduction

Over 59% of oil and gas companies worldwide put priority on accelerating their technical training and considering mobile learning (also known as m-learning) resources (Mercy, 2015). Huge investments have been allocated on self-directed m-learning concept. The overwhelming implementation of m-learning has unfortunately received limited evaluation on its effectiveness, e.g. how much is the training contributing, how much, how often, and how difficult

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is the organisational learning effort of the employee (Parker, 2012). Its influence is still very weak (Blume at el., 2010).

With the growing investment in m-learning, many organisations already started to think carefully pertaining to m-learning's effectiveness in the light of its cost (Laudon & Laudon, 2010). As this m-learning is mainly a preferred mode of learning and instructional method, it may not necessarily influence the learning (Madalena & Eduardo, 2014). Most of the organisations reckoned that the end objective of m-learning is not to cut the training cost, but to focus on encouraging learning (Fontaine, 2005; Tracey & Tews, 2005) and to put into practice the learned knowledge in the competitive environment so as to move toward an effective organisational learning direction (Blume et al., 2010; Herold et al., 2002). Under such circumstances, it is essential to establish the m-learning's relationship, training transfer factors including the self-directed learning, training design, working environment influence, the extent of organisation culture and support, the rate of retention and training transfer (Muhammad et al., 2014; Velada, 2007) towards an effective organisational learning. Predominantly, organisational learning and training transfer will pertain to training personnel, senior managers and key decision makers who are looking at company budgets in organisations, as well as academic researchers and the community.

Anjelica (2011) completed her study in 2011 and found that 38% of employees showed that they did not utilise the skills learnt in the present job, while 82% employees told that they did not really apply the knowledge within six months after completion of their e-Learning training courses. Furthermore, 38% of the employees did not use any transfer knowledge that motivate them in organisational learning. Past literature on the effects of m-learning factors and training transfer as a mediating effect towards effective organisational learning process are missing. Hence, this research paper intends to address the contemporary issues, fill the gaps and clarify the contradictory findings.

The intention of this research study is mainly to understand the perceptions of employees, employers and human resources in the oil and gas company after adopting m-learning technology. Next, it examines the relationships between self-directed learning, training design, working environment, trainee characteristics (Mohammad et al., 2014; Chang et al., 2012) and training transfer process (Van Den Bossche et al., 2010) toward an effective organisational learning (Rebecca & Eduardo, 2011) so as to maximise their returns on on-line training investment.

II. Theoretical Background

In an organisation, the lack of knowledge, little interest, motivation and attention, inadequate training retention and inability of individuals to employ and sharpen their competencies and skills at their workplace (Holton et al., 2000) are key issues that impact and redefine the pre-training and post-training programs. They feel they are unable to utilise all the materials and hard-to-digest mobile learning content to its fullest potential and transfer from tacit knowledge to explicit format (Schank, 2007). There is absolutely no enthusiasm to transfer the learning to a job and foster the creation of learning communities (Allen, 2007). Employees find the pace they are going and the demands of their position do not allow them to block off time without interruptions (Dennis, 2013). The practitioners and academic researchers had a long debate whether countless interruptions stopped them from transferring the training knowledge back to their job to align with effective organisational learning effort. Another myriad reasons could be the nature of text-based online learning and the training design factors. Many employees found the barrier is reading and understanding via self-directed learning content (Gurmak & Glenn, 2014). They are better off listening to instructor face-to-face rather than audio and video to understand concepts (Cheng, 2009). This is one of the challenges and barriers faced by many organisations to transfer the learners' knowledge back to work. As such, lack of experience, motivation, limited reward schemes and insufficient feedback about the training contents might dissuade some from participating (Hylen, 2012) and sharing the training knowledge and transmitting the proper learning, and achieving successful organisational learning in general. Ford (2009) and Awoniyi et al. (2002) argued that less training intervention could result in lower training transfer rate. Muhammad (2010) also reported that huge investment in training was largely wasted due to inadequate transfer.

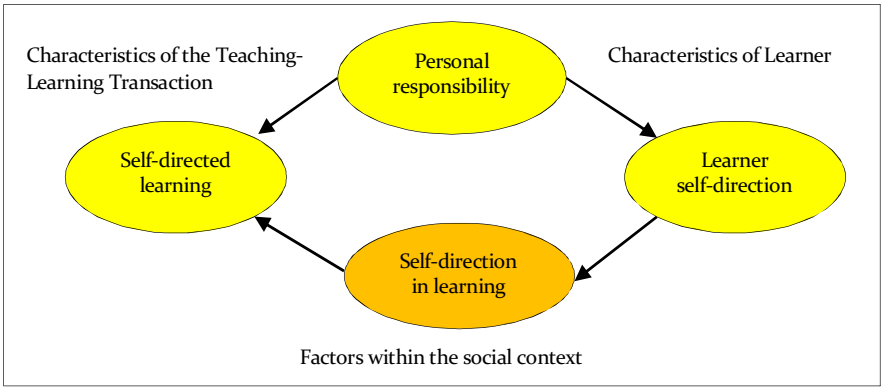
Many scholars through an extensive analysis of the literature have documented factors connected with m-learning. Given the little attention in this field of training transfer as a mediating effect in m-learning and transfer in the organisational learning environment, which is defined as a subset of self-directed online learning education, this research also bring to the forth the literature on m-learning new technology adoption and the Training Transfer effect in the organisational learning requirement (Özdoğan et al., 2012).

1. Self-Directed Learning Theories

In fact, several academics researched self-directed learning in the last three decades. Most notably Craik (1840) and Smiles (1859) research area on self-

help and self-education efforts. Due to inconsistent theoretical base, Brockett & Hiemstra (1991) put huge efforts to understand the broader view of self-direction. This study encompasses the self-concept, learner's readiness, their roles and learning style in self-directed learning model. This model is known as "Personal Responsibility Orientation" (PRO) model (see Figure 1).

The PRO model is possible for assessing and validating the great potential of self-directed learning implementation in organisational settings. However, Brockett & Hiemstra (1991) admitted that external factors like environmental, social and other important factors determining adult learning should be included to test the conceptual ideas in future studies. Hiemstra (1994) also suggested that future research use the assumption that adult learning could occur without the existence of tutors and integrate digital technology and electronic communication in the self-directed learning model.



Source: Adapted from Brockett & Hiemstra, 1991

Figure 1 The PRO model

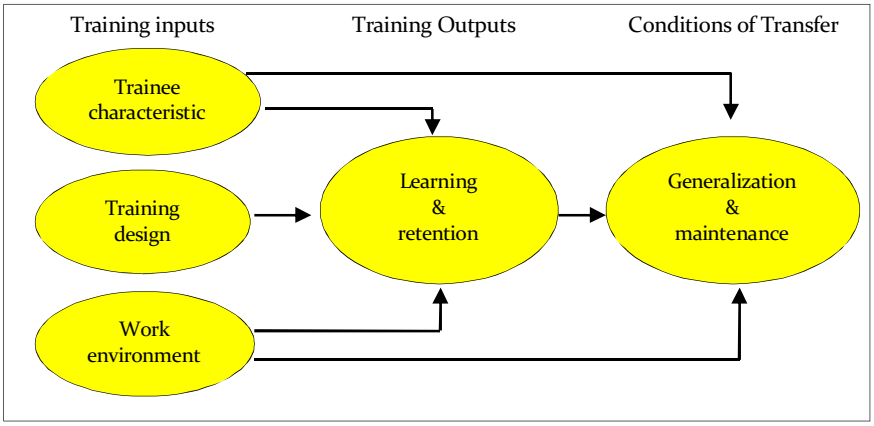
These reasons inspired the researcher to measure the great potential and gauge the successful factor of self-directed m-learning in promoting and enhancing the organisational learning engagement.

2. Transfer Process

The transfer process detailed in Baldwin & Ford (1988) and shown below (see Figure 2) illustrated that "Training outcomes and training input factors are claimed to have a total of six direct or indirect effects on the conditions of transfer".

It is claimed that "Training outputs (learning and retention) have direct effects on the conditions of transfer (Linkage 6). Trainee characteristics (ability, personality and motivation) and work environment (support and opportunity to

use) characteristics are claimed to have indirect effects on conditions of transfer regardless of initial learning (Linkages 4 and 5)". This is then further theorised that retention of learning - the measurement of training outputs - seem widely influenced by the three major training components - i) trainee characteristics, ii) training design and iii) work environment (Chang et al., 2012).



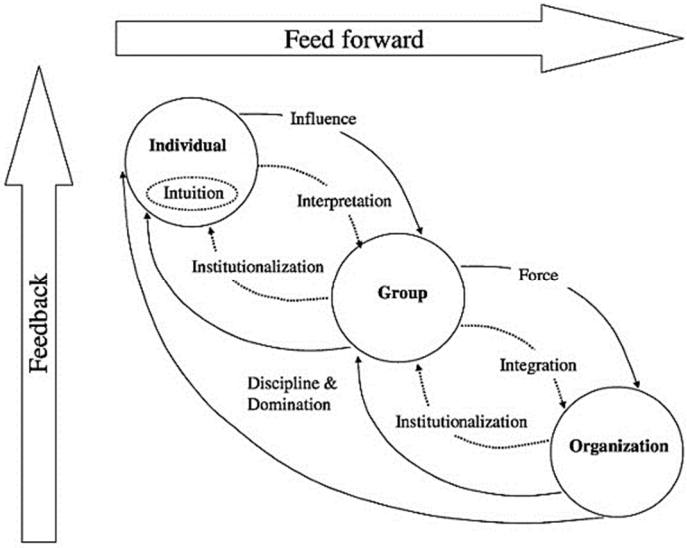
Source: Adapted from Baldwin & Ford, 1988

Figure 2 A model of the transfer process

3. Effective Organisational Learning

Effective organisational learning (EOL) is a dynamic way of knowledge creation and transfer from one place to another across all the dimensions in the organisation between the individual, the group, and the organisation (Real, Leal & Roldán, 2006; Crossan et al., 1999). This concept was derived from the strategic learning assessment map (SLAM) proposed by Bontis et al. (2002). SLAM integrates the key contents of the organisational learning (refer to Figure 3). It analyses effective organisational learning into individual, group or organisation via the theoretical operative framework in an organisation (Feed-forward and Feedback).

This study utilises SLAM as the effective organisational learning construct to quantify the effectiveness of organisational learning. Even though this study put more attention on effective organisational learning, the researcher decided not to include learning flows, feed-forward flows (FF) and feed-back learning flows (FB) in the scope as it is not so relevant to the effective organisational learning focus.



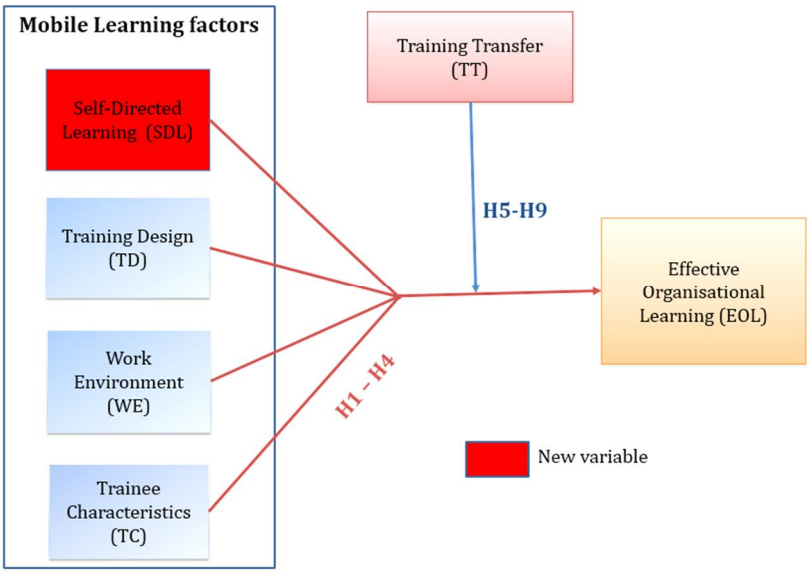
Source: Adapted from Bontis & Crossan, 1999

Figure 3 Strategic learning assessment map (SLAM)

4. Theoretical Framework

From most of the literature review and evidence from many scholars that supported the theoretical background, the researcher designed a theoretical framework of this research to perform an empirical study among the dependent variables and independent variables (Hisham & Mohd, 2012; Anjelica, 2011).

This research added new variables - self-directed learning to determine the factors and effect of m-learning and organisational learning - and examines the mediating effect of training transfer on the relationship between m-learning and organisational learning (see Figure 4).



Source: Theoretical framework designed by the researcher

Figure 4 The theoretical framework of this research

Based on recent empirical studies, this research question would hypothesise the significant relationship of training transfer in the effective organisational learning process.

H1: There is evidence of positive significant relationship between self-directed learning and effective organisational learning.
H2: There is evidence of positive significant relationship between training design and effective organisational learning.
H3: There is evidence of positive significant relationship between work environment and effective organisational learning.
H4: There is evidence of positive significant relationship between trainee characteristics and effective organisational learning.

A number of previous studies and meta-analyses have argued and found less consistency with their conflicting findings on the effect of training transfer and effective organisational learning processes (Barker et al., 2014). Hence, one of the reasons of this research thesis is to understand and find out the training transfer's mediating effect on the correlation between m-learning technology in self-directed learning, training design, work environment, trainee characteristics and effective organisational learning using transfer concept (Blume et al., 2010). It is, thus, reasonable to hypothesise that:

H5: There is evidence the training transfer does mediate the relationship between self-direct learning and effective organisational learning.
H6: There is evidence the training transfer does mediate the relationship between training design and effective organisational learning.
H7: There is evidence the training transfer does mediate the relationship between work environment and effective organisational learning.
H8: There is evidence the training transfer does mediate the relationship between trainee characteristics and effective organisational learning.

III. Research Methods

The study is based on the conduct of a computer survey of around 450 respondents who have attended at least one m-learning course and are working in a Malaysian oil and gas company. This quantitative data is obtained from online questionnaires (Malhotra, 2004).

As the total population is 9,389, a systematic random sampling of 450 data points among the population would involve a selection at every 20th data point. To determine the desired random starting point, Roscoe's (1975) simple rule of thumb is counting the total number of population and dividing by the total sample size. It means that in this research, there are 9,389 workers divided by 450 sample sizes, thus the proposed random starting point of the number is 20 (Ken, 2004).

1. Measurement

The study focused on explanatory research method beginning with pilot test on April 2017 and then followed by online survey questionnaires (Malhotra, 2004) that were sent to all participants (Babbie, 2004). The dependent variables include self-directed learning, training design, work environment and trainee characteristics and mediator effect on training transfer. Creswell (2014) emphasised "in social science research, the independent variables cannot be absolutely proven to cause those outcomes".

Figure 5 is a visual representation of the variables as defined in the research questions, with the effect of variables in several areas: to access the m-learning construct in self-directed m-learning, training design, work environment and trainee characteristics, training transfer variable and individual, group and organisational levels that impact on effective organisational learning. The independent variable is effective organisational learning.

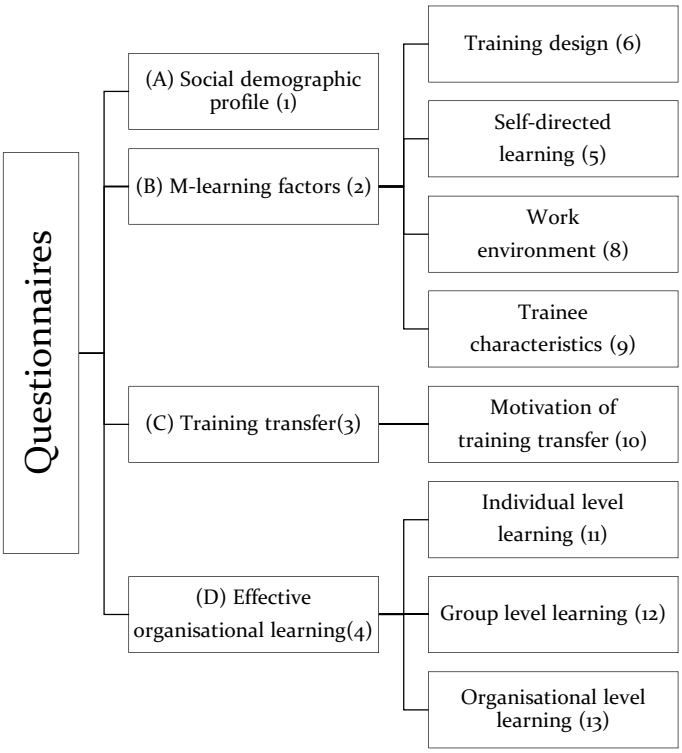


Figure 5 Research instrument

There were 41 questions in the survey designed by the researcher specifically for this study. Instruments in this survey were adapted from Brockett & Hiemstra's (1991) model of the self-directed learning construct, Baldwin & Ford's (1988) approach to the transfer construct and Bontis & Crossan's (1999) model of the effective organisational learning construct. These well-known models are extensively employed, quoted and also commonly praised for their comprehensiveness.

A scale measuring employee motivation initials the survey and was established based on previous studies toward m-learning factors, transfer of training and motivation and core organisational factors. Aspects based on former studies comprise m-learning model proposed by Fezile & Nadire (2011) and Strategic Learning Assessment Map (SLAM) proposed by Bontis et al. (2002) to access the effectiveness of the organizational learning factors. Anjelica (2011) reported that "although none of the courses in the sample would be considered mandatory by the organisation, it is possible that a course may be assigned to the employee as mandatory through a supervisory relationship. This organisation places particular importance on course

completion, which may or may not be relevant in the self-directed m-learning context".

As Baldwin & Ford (1988) concluded that absence of suitable instruments for gauging the work performance is a key problem in the training transfer literature, Holton et al. (2000) designed and confirmed the organizational knowledge-base transfer via the Learning Transfer Inventory System (LTIS) model. However, this instrument was found to be unsuitable for the study due to several reasons such as the focus on determining characteristics of transfer instead of the reflection of the actual transfer. Baldwin & Ford (1988) claimed that "training outputs (learning and retention) have direct effects on the conditions of transfer. Trainee characteristics (ability, personality and motivation) and work environment (support and opportunity to use) characteristics". It seemed to have some effects on transfer levels below:

- Trainee characteristics
- Training design
- Work environment

This self-directed learning survey questions have been enhanced with minor word editing features to show the face validity in the organisation. The pilot study indicated that items identified as self-directed learning are significant to m-learning with certain level of reliability check. The first pilot study produced a reliability alpha of 0.823 for self-directed learning context, 0.899 for quality of training design, 0.870 for work environment factor and 0.819 for trainee environment in m-learning perspective, 0.844 for training transfer factor and 0.893 for effective organisational learning with a total reliability of 0.860. This instrument was then modified to show the self-directed m-learning platform better. One item has been added reflecting variables on "self-directed learning" as examined in some literature reviews. It emphasises the measurement in perceived near-term transfer (Imamoglu, 2007), and perceived long-term transfer (Chyung & Vachonm, 2005).

Effective organisational learning questionnaire: By referring to Bontis et al. (2002) to measure the predictor variables consisting of three dimensions:

- Individual level learning stock
- Group level learning stock
- Organisational level learning stock

These few measurements in organisational learning are mutual factors in Wong & Huang (2011) study in the dimensions of learning setting. Over twenty items from the learning setting were identified and reviewed. The researcher has first adopted three constructs included into the context, however

the last two constructs were then removed due to their repetitiveness. At the end, twelve modified items from the learning setting were selected.

Some aspects of learner background and experience pertaining to the transfer are included in this survey. They include age, level of education, duration in the company and current position, last training in the organisation and indication of success or failure to complete the course.

The value of reliability test for a research is important to indicate good internal consistency reliability (Pallant, 2005). Table 1 shows the result of the Cronbach's alpha and composite reliability for mobile learning factors values, training transfer intentions and effective organisational learning. Cronbach's alpha and composite reliability for self-directed learning, training design, training characteristics to measure the mobile learning factors, and training transfer to measure the mediator role; individual learning, group learning, and organisational learning to measure the effective organisational learning were in the range of 0.814 to 0.901. To investigate the convergent validity of instrument, the researcher examined Average Variance Extracted (AVE) which showed a higher than 0.5 benchmark (see last column in Table 1). This AVE result confirmed that the convergent validity of the model is satisfied.

Table 1 Reliability and validity of data

Variables	No of Item	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Self-Directed Learning	4	0.814	0.825	0.532
Training Design	4	0.891	0.903	0.675
Work Environment	4	0.868	0.885	0.644
Trainee Characteristics	4	0.819	0.870	0.548
Training Transfer	4	0.837	0.875	0.513
Individual Learning	4	0.876	0.897	0.562
Group Learning	4	0.888	0.902	0.609
Organisational Learning	4	0.901	0.908	0.617

2. Data Analysis Method

To bring about a more quantitative measurement, this research adopted the Structural Equation Modeling (SEM) method and Statistical Package for Social Science (SPSS) tools with various techniques to reveal the complex relationship between the dependent and independent variables (Zhai, 2010)

and find out the likelihood of mediating mechanisms for all the main constructs in the dynamic situation of Malaysian oil and gas industry.

A Pearson correlation and Regression testing techniques in SPSS was applied to investigate the significance between m-learning factors and the intention of the effective organisational learning from individual, group and organisation assessment. Correlation coefficient as well as regression analysis were employed to test the entire proposed hypotheses. Overall, the test of the structural model was performed by using SEM AMOS and applied to the conceptual model, path diagram and correlation analysis to consider the rational and significant relationships, mediating effects, and also to evaluate the measurement model for the combined data and the conduct of the hypothesis testing (Cheng & Hampson, 2008, Garver & Williams, 2009).

IV. Results

1. Pearson Correlation Analysis (PCA)

Pearson Correlation Analysis tests have been employed in the research study to explore the correlation between the mobile learning factors (the 16 statements of mobile learning factors) and effective organisational learning (the 12 statements of individual learning, group learning and organisational learning). Table 2 shows that all the below independent variables had a significant correlation (bivariate correlation between independent variables is less than 0.7) to the effective organisational learning.

Table 2 Summary of result of Pearson Correlation Analysis

Variable	R value	F-Statistic	s.e.	P-value
Self-directed learning	0.42	378.567	0.767	<0.001
Training design	0.53	697.423	0.716	<0.001
Work environment	0.54	757.067	0.708	<0.001
Trainee characteristics	0.56	802.537	0.702	<0.001

2. Regression Analysis

A standard Linear Regression test model was tested. The full variables were reported to greatly contribute to prediction of effective organisational learning (p value < 0.001), which is less than the threshold set (below 0.001). Each component of the self-directed learning, training design, work environment

and trainee characteristics had a significant amount of its variance explained by effective organisational learning components. Table 3 shows that all the hypotheses from H1 to H4 were supported.

Table 3 Summary of result of Linear Regression Analysis

Variable	R value	R-Square	B	s.e.	P-value	Conclusion
Self-directed learning	0.42	0.17	0.344	0.767	<0.001	Significant
Training design	0.53	0.28	0.474	0.716	<0.001	Significant
Work environment	0.54	0.30	0.483	0.708	<0.001	Significant
Trainee characteristics	0.56	0.31	0.527	0.702	<0.001	Significant

3. Structural Equation Modeling (SEM) Analysis

The SEM analysis assessed the model fitness and found that the hypothesised mediation relationships were consistent as per theoretical expectations and outcomes (Cheung & Resnvold, 2002). Training transfer represented an endogenous variable to examine the causal relationship among the exogenous variables (MacKinnon, 2008). As expected, the causal analyses provided by the SEM analysis shows evidence that all the mobile learning factors (self-directed learning, training design and work environment) are positively related with training transfer mediator, except for trainee characteristics. As presented in Table 4, all the model-fit indices are recommended to follow the common acceptance level by Hair et al. (2006).

This paper intended to compare and indicate whether the proposed model fits significantly better than the competing models (Hair et al., 2006). It is more appropriate to analyse several competing models and compare the results rather than choosing a single model. Figure 6 shows the proposed model (applied to this research hypotheses) and another two competing models (contain additional paths with assumption of different hypotheses) by evaluating the chi-square differences and the degree of freedom to decide which model is the preferred one. This test allows the researcher to decide if a given model fit is significant and considered as a preferred model than a competing model.

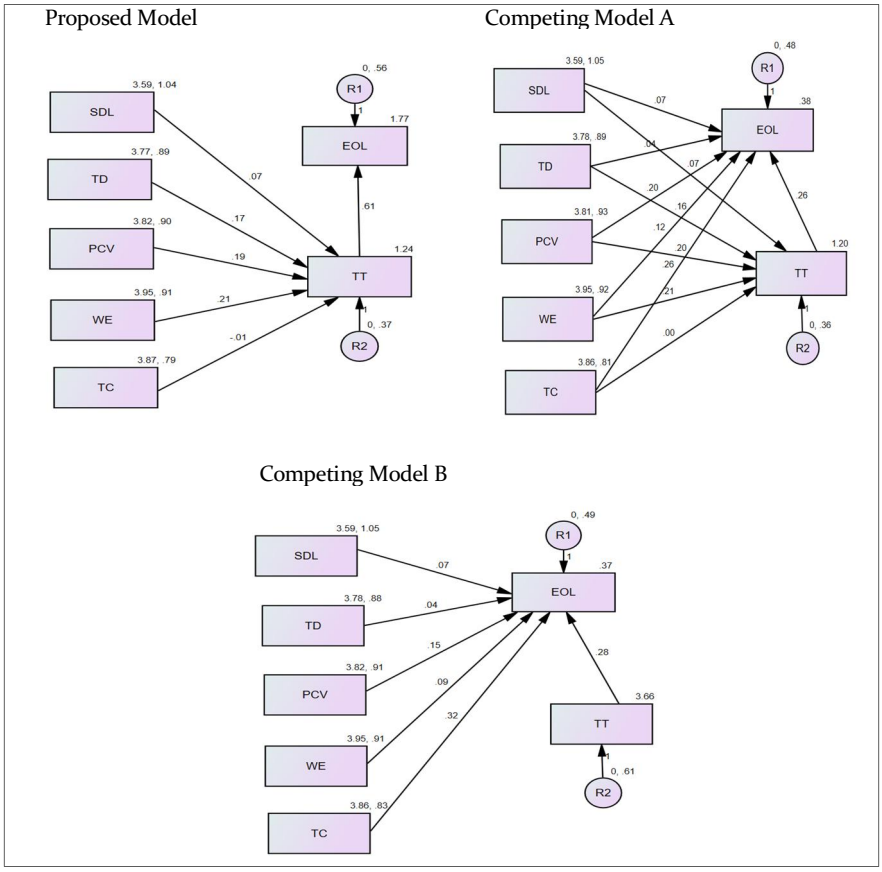


Figure 6

In Table 4, the top five indicators have been accessed and demonstrated that the measurement model below exceeded a good index fit with the empirical data collected (Fan & Sivo, 2009). The proposed measurement model with CFI value 0.935 exhibited this indictor and is an acceptable fit (Cheng, 2008). Since this CFI value is not less than 0.950, Hu & Bentler (1999) further concluded that this result was representing a good fit. The Root Mean Square Error of Approximation (RMSEA) offered a value 0.020 in the proposed model was deemed as a good fit where RMSEA is recommended to be as low as 0.100 (Meyers et al., 2006; Byrne, 2001, p.85). Next, the Chi-square/degree of freedom (CMIN/d.f) with value 3.123 also denoted an adequate fit where CMIN/d.f is less than 5 was touching an acceptable baseline (Cheng, 2008). The value of Tucker-Lewis Index (TLI) is 0.919 for the proposed model and 0.916 for the competing model B, also indicating as a perfect fit (TLI is greater

than 0.890) for a close fit of the model (Reisinger & Mavondo, 2006). Not surprisingly, the value of Incremental Fix Index (IFI) also known as comparative (Miles & Shevlin, 2007) with value 0.935 had exceeded the benchmark value of being greater than 0.900 (Lai, 2009). The overall model fit indexes of the structural model for the proposed structural model, competing model A and B was impressive and indicating a good fit (see Table 6).

Table 4 Structural model fit

Overall Model Measure	Proposed Model	Competing Model A	Competing Model B	Acceptable Model Fit	Acceptable Baseline
CFI	0.935	0.886	0.932	Passed	≥ 0.90
RMSEA	0.020	0.026	0.020	Passed	< 0.10
CMIN/DF	3.123	4.669	3.207	Passed	< 3
TLI	0.919	0.886	0.916	Passed	≥ 0.89
IFI	0.935	0.887	0.932	Passed	≥ 0.90

This nested model test was mainly intended to measure the fit of the proposed model to alternative models with the same variables (Oczkowski, 2002). To compute the test, the different fit indexes, model parsimony, chi-square value as well as the variance of the degrees of freedom from the proposed model, two competing nested models were examined to observe whether the proposed model fits significantly in contrast to competing models (Newsom, 2017). It showed that competing model A (chi-square 1442.772) and B (chi-square 987.854) in Table 6 indicate that both of them were "smaller" models and many paths were found with no statistical significance (Bollen, 1986, Kline, 1998) as compared to the proposed model (degrees of freedom 309 and 308 respectively) with fewer parameters (distinct parameters 96 and 97 individually). Christina & Schermelleh-Engel (2010) indicated that the larger model with more direct paths and lowest chi-square with additional parameters (proposed model with chi-square 949.295; distinct parameters 101 and degrees of freedom 304) were deemed a more significant fit than the "smaller" models (see Tables 5 & 6). Therefore, in this test, the proposed model was an acceptable fit model (Schermelleh-Engel et al., 2003).

Table 5 Computation of degree of freedom

	Proposed Model	Competing Model A	Competing Model B
Number of distinct sample moments	405	405	405
Number of distinct parameter to be established	101	96	97
Degree of freedom	304	309	308

Table 6 Results

Minimum was achieved	Proposed Model	Competing Model A	Competing Model B
Chi Square	949.295	1442.772	987.854
Degree of freedom	304	309	308
Probability level	0.000	0.000	0.000

The direct and indirect effects of Tables 7 & 8 showed the unstandardised estimates for the casual paths. All these estimate paths for indirect effect were statistically significant with p-value less than 0.05 ($p<0.05$; Hair et al., 2007). The outcome of the analysis indicated there was a reasonable direct effect between training transfer ($\gamma=0.264$) and effective organisational learning. The result also indicated there were significant direct effects between self-directed learning ($\gamma=0.069$); training design ($\gamma=0.042$); work environment ($\gamma=0.124$); trainee characteristics ($\gamma=0.262$) and effective organisational learning. From this research, it suggested that every dimension of mobile learning factors was a significant predictor of effective organisational learning.

Table 7 Summary of direct effects

Variables	Direct Effects
Self-Directed Learning → Effective Organisational Learning	0.069
Training Design → Effective Organisational Learning	0.042
Perceived Content Validity →Effective Organisational Learning	0.198
Work Environment → Effective Organisational Learning	0.124
Trainee Characteristics → Effective Organisational Learning	0.262
Training Transfer → Effective Organisational Learning	0.264

Likewise, the mediation analysis discovered that there is an indirect effect between self-directed learning ($\beta=0.074$), training design ($\beta=0.162$), work environment ($\beta=0.206$) towards training transfer. However, trainee characteristics item contains zero direct effect ($\beta=0.000$), which revealed no

significant effect through training transfer. This SEM study indicated that all the paths in the indirect effect between endogenous and exogenous variables were much stronger than direct effect. Work environment also has a similar indirect effect on effective organisational learning mediated by training transfer.

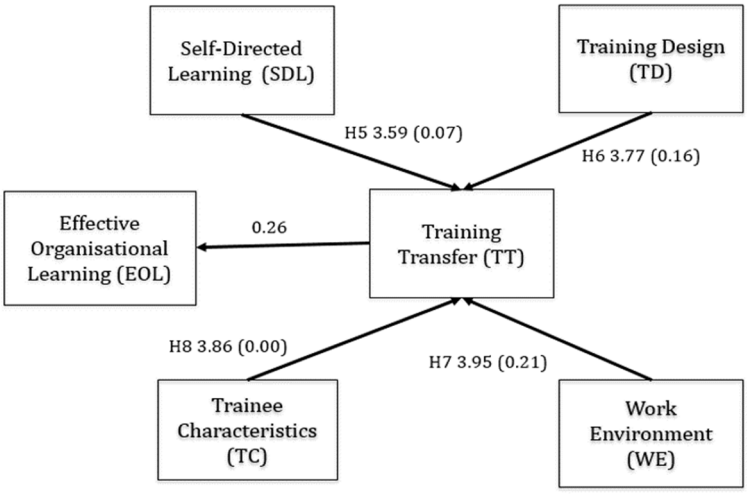
Generally, this finding suggested that training transfer did fully mediate the relationship between mobile learning factors and effective organisational learning. The path from trainee characteristics to training transfer was not supported, which mean the trainees characteristics have no indirect significant effect on effective organisational learning via training transfer mediator. The workers in the oil and gas companies largely agreed that training transfer did mediate and effect their individual, group and organisational performance.

Table 8 Summary of effects

Variables	Direct Effects	Indirect Effects	Total Effects
Self-directed learning →Training transfer	-----	0.074	0.074
Training design → Training transfer	-----	0.162	0.162
Work environment → Training transfer	-----	0.206	0.206
Trainee characteristics → Training transfer	-----	0.000	0.000
Training transfer → Effective organisational learning	0.264	-----	0.264

Taken from Standardised Model Fix in Figure 7, 21 percent of the variance of training transfer was explained by work environment. Training design also explained 16 percent of the variance of training transfer. Among the variables, self-directed learning only explained 7 percent of the variance of training transfer. Additionally, training transfer explained 26 percent of the variance of effective organisational learning.

Out of the four proposed hypothesised relationships on mediation analysis, three relationships were significant and one relationship was below the significance level ($t<1.96$). Almost all significant relationships had relatively high statistical significance levels and the indirect effect was significant. Hence, this research suggested that training transfer has an indirect effect on self-directed learning, training design and work environment towards an effective organisational learning.



Standardized model fit

Figure 7 Complete model

V. Discussion and Conclusion

Many organisational scholars have isolated training transfer and effective organisational learning into different contexts and so far there is no research study about the extent to which these transfer factors affect the effective organisational learning performance. This research paper provided a unique opportunity to investigate the mediator role of training transfer towards effective organisational learning within the mobile learning platform. There is some evidence that mobile learning technology is an overall effective tool for learning.

Mobile learning and transfer of learning experience following successful organisational learning efforts can result in excellent performance improvement (Lee, 2010). This study has focused on examining the issues on mobile learning factors, and training transfer post-learning that affect workers on effective organisational learning. The mobile learning model, training transfer model and strategic learning assessment map (SLAM) were commonly adopted in the previous research to validate the influence of learning transfer in organisations in different settings (Holton et al., 2007). However, there has been a dearth of empirical investigation on mobile learning and training transfer factors that influence effective organisational learning performance in Malaysia.

Based on the sample in this study, the hypotheses testing in Table 9 shows there is evidence to support the relationship between self-directed learning (H1), training design (H2), work environment (H3) and trainee characteristics (H4) and effective organisational learning. In addition, the mediation analysis performed has confirmed that training transfer did mediate the relationship between all the mobile learning factors and effective organisational learning (H5 to H8). This outcome is consistent with a finding done by Nik et al. (2011) in developing countries like Malaysia. Consistent with prior studies, Wong & Huang (2011) also employed SLAM and training process to investigate factors and they confirmed online learning significantly improves the transfer of learning and drive the effectiveness of complete organisational learning.

The result shows clear evidence that mobile learning factors are antecedent to organisational learning and transfer of learning, and recognise these factors as playing a key influential role on learning motivation in Malaysia oil and gas industry. In the complex and turbulent oil and gas business organisations, individuals need to learn quickly and adapt to digital transformation and transfer of learning. The investigation proved the influence of training transfer as a mediating variable among many aspects of mobile learning and effective organisational learning outcome.

Table 9 Summary of hypotheses and conclusion

No	Hypothesis for This Research	Finding	Conclusion
H1	There is evidence of a positive significant relationship between Self-directed learning and effective organisational learning	Supported	Positive Relationship
H2	There is evidence of a positive significant relationship between training design and effective organisational learning	Supported	Positive Relationship
H3	There is evidence of a positive significant relationship between work environment and effective organisational learning	Supported	Positive Relationship
H4	There is evidence of a positive significant relationship between trainee characteristics and effective organisational learning	Supported	Positive Relationship
H5 to H7	There is evidence mediate the relationship between self-directed learning, training design, work environment and effective organisational learning	Supported	Positive Relationship
H8	There is evidence mediate the relationship between trainee characteristics and effective organisational learning	Not Supported	Negative Relationship

This study supports prior research that found that training transfer has no indirect relationship on the trainee characteristics on effective organisational

learning. This H8 mediating effect was found to be the barrier and affecting training transfer intention to advance the effective organisational learning intervention (Sakina, 2013). This is consistent with Karen's (1997, p.124) finding in "contextual barriers to transfer of training" and Jenni's (2013, p.21) report in "mobile learning - a review of current research".

This present review opens up new avenues of investigation and makes a contribution to the vast range of effective organisational learning and training transfer using mobile learning. In this study, training transfer was found as a mediator when linking mobile learning factors and effective organisational learning together. Many academic communities and HRD professionals have been giving considerations to effectively manage the organisational learning and training transfer processes.

> H1: There is evidence of a positive significant relationship between self-directed learning and effective organisational learning.

The results of this study have shown that self-directed mobile learning plays an imperative role in changing an organisation into an effective organisational learning orientation. This kind of self-selected or self-directed learning is the bottom line for accelerating the effectiveness of organizational learning (Bartholomew, 2015; Barker et al., 2014). Study results also revealed that "self-directed learning" has a significant and better effect on effective organizational learning. Pertaining to the feedback from the employees, this survey results endorsed the view that employees will be more interested in using self-directed mobile learning methods if this kind of system is able to provide them with flexibility, good functionality and is user friendly. They are key enablers of organisational performance improvement. To encourage the awareness and willingness of employees to use the self-directed mobile learning concept, HRD and supervisors should always encourage the owners who oversee the learning process and self-monitoring system, to provide feedback and evaluation to make meaningful organisational learning plans.

The result of this research study reveals that self-directed learning has positive significant relationship with effective organisational learning and this finding is somewhat consistent with Jenni's comprehensive view where she stated, "How the mobility of learners augmented by personal and public technology can contribute to the process of gaining new knowledge, skills and experience" (Jenni, 2013, p.2). However, the desired learner's self-centered and disciplinary system is more popular in the educational world and yet to be deeply rooted with diverse target working groups in the eastern context (Lee, 2010). If the individual places inappropriate priority on his/her learning goals, fall behind in effective learn, or for some reasons drop out of the learning and training schemes, the individual and eventually the organisations could fail to

transfer the learning back to the organisation (Anjelica, 2011, p.7). In Malaysia oil and gas context, the result of this hypothesis supported a reciprocal relationship between self-directed mobile learning and effective organisational learning level. Generally, the apprentices are willing to devote efforts in this autonomous learning approach to procure a top level of organisational learning and work performance.

> H2: There is evidence of a positive significant relationship between training design and effective organisational learning.

The reason for this explanatory research is to confirm the prediction of training design as an important contributing element that supports and measure the effective organisational learning. This finding provides support for re-evaluating the influence of training design factor which is closely aligned to effective organisational learning's capability to bring in more benefits to the organisations.

This is similar with the findings suggested by various researchers that effective training design has been found to be the key influence over promoting effective organisational learning in the distant future (Blume et al., 2010; Burke & Hutchins, 2007). Empirical evidence showed a strong link between training design and organisational learning process (Cheng & Hampson, 2008; Salas & Cannon-Bowers, 2001).

The result proved that Malaysia oil and gas workers can strive to achieve organisational learning objective with the innovative training design such as short and concise on-line instructional design, job relevance of training content and all new online learning methods. This way will induce them to acquire and apply the new skills or ideas to create the positive connection back to the organisational learning community (Baldwin & Ford, 1988; Karen, 1997).

> H3: There is evidence of a positive significant relationship between work environment and effective organisational learning.

The work environment factor has been identified as a leading predictor of organisational learning process (Blume et al., 2010; Holton et al., 2003) and yet has been less explored in training design and trainee characteristics dimensions (Cheng & Ho, 2001; Burke & Hutchins, 2007; Brown & McCracken, 2009; Alvarez et al., 2004; Baldwin & Ford, 1988; Holton et al., 2000). As there is insufficient indication regarding any clear-cut impact of work environment (Clarke, 2002) towards effective organisational learning aspect, this hypothesis led this study and the major findings can be summarised as following:

The result of this study documented that the work environment did influence the outcome of effective organisational learning. With great investments in and allotment of resources to the learning space in Malaysia oil and gas companies, generally apprentices have no difficulty in applying the learned knowledge to the organisational learning community due to the climate and support from the work environment (Homklin et al., 2013; Pham et al., 2010). These factors included strong custodian support, team support, feedback, equipment availability, and the convenience to use learning and openness skills at the workplace (Imran et al., 2015). All these aspects are directly related to the learned behaviours on effective organisational learning (Shariff & Al-Makhadmah, 2012; Jacqueline, 2006).

This aligns with Blume et al. (2010) finding that the work environment is comprised of three main categories: i) support (peer support and supervisor support), ii) transfer climate, and iii) organisational constraints (insufficient autonomy and situational constraints), which are the consistent predictors of organisational learning.

> H4: There is evidence of a positive significant relationship between trainee characteristics and effective organisational learning.

The findings of the study suggest that trainee characteristics played an important role and was a statistically significant factor of organisational learning interest and motive (Bell & Ford, 2007). Knowledge acquisition in the learning environment is determined by numerous factors such as individual's ability, individual's aspiration to move forward and their learning intention (Ahmad, 2012).

Organisational learning in the context of Malaysia oil and gas segments is positively affected by trainee characteristics, which originated from the individual's personality, ability and willingness to learn and to transfer (Abdulaziz, 2017; Velada et al., 2007). These internal factors include self-efficacy, attitudes, behaviours and motivations that can connect the learned skills to practices and maximise the learning and result in the effective organisational learning improvement (Lee et al. 2014; Tziner et al., 2007; Wen & Lin, 2014; Werner & DeSimone, 2009, p.68-69).

> H5-H8: There is evidence that training transfer does mediate the relationship between self-direct learning, training design, work environment, trainee characteristics and effective organizational learning.

The findings have confirmed that the relationship between mobile learning contextual factors, namely self-directed learning, training design, and work environment and effective organisational learning, are indirect and mediated

by training transfer. Specifically, work environment is a high predictor of transfer and organisational learning process. These findings are consistent with prior findings related to the training transfer process and effective organisational learning contexts in which mobile learning takes place. They are pertinent to the progress of effective organisational learning efforts (Massenberg et al., 2015; Van Den Bossche et al., 2010).

Unlike other past research regarding the relationship between trainee characteristics and training transfer, the current study indicates the extend to which trainee characteristics' computer self-efficacy, core self-evaluation, and motivational resources from the trainees in mobile learning are not mediated through training transfer. There isn't any significant indirect effect when this predictor is entered into the mediating analysis model. This finding is not surprising as the perception of the ease of completion of the mobile learning program is fully dependent on how learners distinguished themselves as competent in using new technology and their intention to transfer what they have gained in mobile learning (Nik et al., 2016; Imran et al., 2015). They are usually reluctant to transfer and apply the new knowledge acquired and disseminated throughout an organisation from mobile learning if they did not feel that the program is easy to follow through or relevant to them (Curado et al., 2015; Bauer et al., 2015). Liaw (2002) argued that the organisation should seriously consider a reward scheme and compensation system to motivate the employee to transfer the learning instead of investing only on high-end technology in the modern learning environment. According to Eyal (2008), trainees require the exertion of more energy, more effort, support and attention when it comes to autonomous learning.

In the last decade, western researchers concluded that training transfer had a better positive effect on the learning organisation in the context of western countries (Laura & Gary, 2016; Anjelica, 2011). This research intends to fill the gaps in the literature by investigating the effectiveness of organisational learning with the explosion of mobile learning and the power of influence on training transfer in the context of an eastern country like Malaysia. This paper contributes to find out the nature of this connection in the Malaysian context.

Although this research result cannot be generalised due to its limitation or non-representative sample size, the result of this study shed new light on the proposed directions of effective organisational learning and training transfer using mobile learning in Malaysia. Findings have revealed that transfer of training and effective organisational learning remains an important direction for future exploration.

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