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Measuring Learning Enablers in the Malaysian Armed Forces: Pre-Testing and Pilot Testing of the Research

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Abstract. This paper reports the findings of a study aimed at addressing learning enablers in the Malaysian Armed Forces. To accomplish this objective, an instrument has been developed. The constructs used to assess learning enablers were derived from the literature review. A total of nine construct were used, namely continuous learning, dialogue and inquiry, team learning, employee empowerment, leadership for learning, system connections and embedded system. A perceptual measures adapted from the literature were developed and pre-tested with eight experts. Their comments and feedback were used to refine the measures. Accordingly, a pilot testing was conducted involving 40 respondents who were military officers. The results of the analysis showed that the measures were acceptably reliable. The findings of this study will be used for a follow-up study that will examine the interrelationship between those constructs.
Keywords: Learning enablers, construct, pretest, pilot test, knowledge management.

1 Introduction

The development toward organizational learning among scholars and experts is increasingly becoming a source of interest. Research has been carried out to analyze and quantify the variables that lead to enablers of learning, to learning accomplished or to learning in general, or to the relationship between certain modes of learning outcomes. The attainment of learning outcomes for any learning organization is associated with certain enablers or predictors (Crossan, Lane, & White, 1999; March & Olsen, 1976; Simon, 1991). People-related factors and structural-related factors are the most commonly identified enablers (Senge, 1995; Torraco, 1999; Zack, 1999; Li et al. 2009). Empirical studies have also influenced the theoretical uncertainty in the area of organ-

izational learning. Many researchers have established measurement scales of organizational learning (Bontis et al., 2002; Crossan et al., 1999; Tippins and Sohi, 2003; Templeton et al., 2002). An effective scale of measurement, however, has never been established (Bappuji and Crossan, 2004; Gallagher and Fellenz, 1999; Lyles and Easterby-Smith, 2003). From the literature review, no studies have so far been carried out in military organization's using an integrated measurement scale to capture and verify learning enablers, learning motivation and performance outcomes, and very few studies have used these dimensions to measure the learning organization in relation to performance in the public or government sector (Easterby-Smith, M. 2000). Previous studies exploring people and structural related factors were conducted in a non-military-based organizations enablers. Not much is known the degree or level of people and structural factors in the context of military-based organization (Easterby-Smith, M. 2000; Talbot, Fidock, Drobnjak & Stothard, 2007). Is the situation comparable to past studies? Therefore, the need to empirically validate the dimensions and the corresponding scale is very crucial.

To this effect simply adopting the dimensions together with the scales without undergoing validation process would raise the issue of validity and reliability. Consequently, the understanding of public sector organizational learning practices, especially in the military perspective, is a field that demands further research. The study aims to validates and test an integrated scale to quantity all features of organizational learning enablers at the level of people and the structural level of learning, learning motivation, learning outcomes, and its relationship with the military organization's organizational performance. The research are driven by these objectives; to identify the level of learning enablers in terms of people and structural in Malaysian Armed Forces, to identify the level of learning motivation of military officers in the Malaysian Armed Forces, to identify the level of learning outcome in terms of individual, group and organization at the Malaysian Armed Forces, to describe how learning enablers and learning motivation increase learning outcome in the Malaysian Armed Forces and to explore how learning motivation mediates the relationship between learning enablers and learning outcome.

2 Literature Review

Mining the literature unveiled that there are an enormous number of enablers of learning organizations. Among them are continuous learning (CL), dialogue and inquiry (DI), team learning (TL), employee empowerment (EE), leadership for learning (LL), systems connections (SC) and embedded systems (ES). McCaffrey's (2004) research on the Australian public sector found that all seven dimensions/enablers of the learning organization are substantially linked. Thus, for the structural level dimensions/enablers, McCaffrey (2004) and Birdthistle (2006) did not recognize such a mediatory function. Yang et al. (2004) also accepted that these seven dimensions/enablers are distinct but interrelated in a learning organization. This research therefore focuses on the fact that all seven dimensions/enablers are key components of an organization's

learning appreciation system. These seven dimensions/enablers for learning are interrelated and influence the outcome of learning. A study by Watkins and Marsick's (1993) has identified learning enablers as comprise of CL, DI, TL, EE, LL, SC and ES. They have developed the Dimensions of the Learning Organization Questionnaire (DLOQ) to measure the key enablers of organizational learning.

DLOQ, is a constructive framework for learning delivery that has seven components for people-oriented and structure-oriented elements with learning-related factors. It is believed that the effective model of learning organizations can incorporate people and organizational structures together to enable lifelong learning and promote organizational change (Yang et al., 2004). The literature review focuses on research or principles related to the implementation of the concept of learning organization using DLOQ and its association with organizational performance. Most studies have tested the psychometric properties of DLOQ in different cultural contexts to test the applicability of the concepts of the learning organization. DLOQ has gone through many ways of validation evaluation from an application perspective and has been assessed using many variables (eg Ellinger, Ellinger, Yang, & Howton, 2002; Yang, 2003). Yang, Watkins, and Marsick (2004) evaluated the construct validity and score reliability of the DLOQ based on the conceptual frameworks of DLOQ models. Using nomological network analysis, the results were scrutinized, and the findings of this study generally concluded that DLOQ was a valid measure for identifying the learning organization construct.

Their study was further validated by Jyothibabu, Farooq, and Pradan (2010). They proposed another model that included organizational learning and its antecedents. Organizational learning was divided into two levels in their model: a people level and a structural level. The Jyothibabu, Farroq, and Pradan (2010) model was created to encompass all aspects of organizational learning. Jyothibabu et al. (2010) created an integrated measurement scale that incorporates both of these viewpoints, with the goal of surveying Indian thermal power plants. This six-point Likert-type scale was created by combining and refining Yang et al. (2004)'s DLOQ, which assesses learning enablers, and Bontis et al. (2002)'s scale, which assesses learning outcomes at the individual, group, and organizational levels and links them to organizational performance. Given that the constructs developed by Watkins and Marsick's (1993) were highly cited by researchers, the present study would also adopt these constructs. The constructs and the corresponding operational definition are illustrated in Table 1.0:

Table 1.0: Learning Enablers Construct and Operational Definition

Construct	Operational Definition
Continuous Learning	The organization's effort to create continuous learning opportunities for all of its members (Watkins and Marsick (1993)
Dialogue and Inquiry	An organization's effort to create a culture of questioning, feedback, and experimentation (Watkins and Marsick (1993)
Team Learning	Reflects the spirit of collaboration and the collaborative skills that undergird the effective use of teams. (Watkins and Marsick (1993)
Employee Empowerment	An organization's process to create and share a collective vision and get feedback from its members about the gap between the current status and the new vision (Watkins and Marsick (1993
Leadership for Learning	The extent to which leaders think strategically about how to use learning to create change and to move the organization in new directions (Watkins and Marsick (1993)
System Connection	Reflects global thinking and actions to connect the organization to its internal and external environment. (Watkins and Marsick (1993)
Embedded System	Indicates efforts to establish systems to capture and share learning and integrate with work in which staff have access to these high and low-technology systems (Watkins and Marsick (1993)

3 Research Methodology

The present study adopted a quantitative research methodology. In this study, as stated by Pinsonneault & Kramemer (1993), the survey research methodology will be adopted due to its suitability in responding to the research questions and attaining the research goals. This study used convenience sampling. According to the calculation (based on 95% confidence level and 5% margin of error for gathering information), 321 is the minimum recommended size of the survey from the total number of 1922 military officers in the MAF HQ. The researcher decided to have 400 respondents to participate in this research. Based on a segregated random sample size, the population was separated according to the three services; the Army, the Navy and the Air Force. Military officers with the equal rank of Second Lieutenant to Major General are the respondents involved in this research. The current study is based on a survey research method, and a questionnaire has been adapted via an extensive review of the literature to collect data from military officers in MAF HQ. All questions related to learning enablers are scored based on the seven-point Likert Scale. A total number of learning enabler's items is 38. Descriptive analysis, factor analysis, and correlation analysis were conducted using the SmartPLS platform.

In the context of this research, findings from pre-testing and pilot testing involving the instrument facilitated the researcher in improvising the actual instrument to suit the nature of the study. Feedback from the experts and selected respondents was taken into consideration and necessary modification was made thereafter. In addition, Cronbach's

Alpha values were observed during the pilot testing. Assessing the quality and durability of data for reliable outcomes is necessary. The validity test before questionnaire dissemination would be critical for the present research analysis to prevent confusion in questions that can contribute to misinterpretation. In any research, the validity of the measurement tool is tremendously important to ensure accuracy, clear wording, correct definition and coverage of topics, such that the instrument measurements were those for which it was designed (Field, 2013). The process of developing the questionnaire involved pre-testing and pilot testing (Masrek et al., 2017). Some researchers combine pre-testing and pilot testing to identify the validity of the instrument. In the context of this research, the pre-testing and the pilot testing were conducted separately. The objectives of pre-testing and pilot testing are to assist the researcher before going to the main data collection work to drop or add the required questions.

3.1 Pre – Testing

A pre-testing is a required next element of the research process to validate the research instrument. In this context, the instrument is a questionnaire. Pre-testing the instrument is an essential means of identifying problem aspects, reducing measurement mistakes, lessening the load of respondents, assessing whether or not respondents correctly interpret questions, and ensuring that the order of questions does not affect the way a respondent responds (Cooper, 2016). In reality, the proportion of initiative invested in preparation and pre-testing surveys is directly linked to the ease with which data can be evaluated and the value of the findings (Grimm, 2010). Another reason for pre-testing is to meet the face accuracy requirement, explained by Sekaran and Bouge (2010), by checking whether a scale item is read at first glance as if it were measuring what it should measure. Pre-testing the questionnaire will examine all aspects of the questionnaire including the content validity, the wordings, the ordering of questions, the instructions, the layout, formatting, font and the length of the questionnaire.

The process of pre-testing the questionnaire involves a group of evaluators among experts in the topic as well as potential respondents. According to Burton & Mazerolle (2011), pre-testing or factual validation can be performed by a group of experts and/or potential respondents. A group of experts would normally conduct a test to support the content validity of the questionnaire (Sekaran & Bougie, 2016). To perform a pre-testing of the instrument, several experts have been identified. Lynn (1986) recommended a minimum of three experts but specified that more than ten were perhaps unneeded. In the context of this study, eight experts were asked to evaluate the instruments. The experts critically review and provide recommendations that give more clarity and relevance to the questionnaire. Most panellists suggested rephrasing questions, reducing the number of questions, eliminating typographic mistakes, rephrasing questions, and reshuffling and removing similar items. All possible and applicable suggestions were considered for implementation in the instrument.

3.1.1 Content Validity Index

By calculating a Content Validity Index (CVI), previous researchers also provide proof of content validity (Polit & Beck, 2006). Researchers measure two kinds of CVIs, as stated by Lynn (1986). The first type includes the validity of the content of individual elements and the second type includes the validity of the content of the total scale. These item scores are usually on a 4-point ordinal scale, by convention, and founded on the recommendation of earlier researchers such as Lynn (1986) and Waltz (1981). Lynn (1986) indicated that it was possible to have 3 or 5-point rating scales, but she favoured using a 4-point scale to prevent getting a neutral and ambiguous midpoint. In the context of this study, the four-point labels are 1= No relevance at all, 2 = Item needs some revision, 3 = Relevant but needs minor revision, and 4 = Very relevant. The Content Validity Index for Items (I-CVI) is then determined for each item as the number of experts giving a rating of either 3 or 4 (thus dichotomizing the ordinal scale into relevant and non-relevant) divided by the total number of experts involving eight experts in this study. Lynn (1986) indicated that if there are 8 experts in total, I-CVIs should not be less than 0.78. The Content Validity Index for Scales (S-CVI) was the other form of content validity carried out to calculate the content validity of the overall scale comprising the Universal Agreement (UA) and Ave (Average). The findings for the validity of the content have been summarized using Table 2.0.

Table 2.0: Summary of Content Validity for Learning Enablers

Construct	I-CVI (>= 0.78)	S-CVI/Ave (>=0.86)
Continuous Learning	1.00	1.00
Dialogue and Inquiry	1.00	1.00
Team Learning	0.97	0.97
Employee Empowerment	0.95	0.95
Leadership for Learning	0.97	0.97
System Connection	0.97	0.97
Embedded System	0.97	0.97
OVERALL	0.97	0.97

For all the items, the I-CVI varied from 0.95 to 1.00 for all dimensions. The S-CVI (Average) also ranged from 0.95 to 1.00. The overall S-CVI was 0.97, indicating the high content validity of the items for the construct. As they have a relatively high value of agreement among experts, all the constructs are maintained. It can be established that the pre-testing scores are above the suggested standard and that the constructs selected for the survey instrument are acceptable.

3.2 Pilot Testing

In preparation for the full study, pilot testing is a mini version of a full-scale analysis or a trial run. Specific pre-testing of techniques of survey, such as questionnaires or

structured interviews, may also occur. Possible errors in measurement procedures (including instructions, time limits, and so on) and the operationalization of independent variables need to be found. To describe unclear or ambiguous things in a questionnaire, pilot testing is often useful. The non-verbal behaviour of participants in a pilot study can provide valuable information about any discomfort or stress they experienced concerning the content or wording of the elements of the questionnaire.

Hazzi and Maldaon (2015) explained that pilot testing is the foundation of effective research layout and an essential preliminary phase in research is truly pilot research, and this applies to all forms of research. One of the aims of doing pilot testing is to assess the reliability of every construct. Reliability or reproducibility indicates whether a questionnaire works consistently (Greco et al. 1987). Hair et al. (2006) stated that other names of reliability are reliability, stability, consistency, reproducibility, predictability, and lack of bias. To further validate the instrument, a small pilot testing or survey of randomly selected 40 respondents (representing 10% of the study sample size) from the various departments in MAF HQ was carried out. The pilot testing of this study was analyzed using the Statistical Package for Social Science (SPSS) to ensure that the measurement scale was adequate for gathering actual data. The findings for the overall Cronbach Alpha for learning enablers have been summarized using Table 3.0. Reliability can be calculated with Cronbach's Alpha Coefficient analysis in which, according to (Sekaran & Bougie, 2009), values below 0.6 are poor, 0.6 to 0.7 are acceptable and above 0.8 are good.

Table 3.0: Overall Cronbach Alpha for Learning Enablers

Construct	No of items	Cronbach Alpha	Remarks
Continuous Learning	4	0.755	Acceptable
Dialogue and Inquiry	5	0.867	Good
Team Learning	5	0.712	Acceptable
Employee Empowerment	6	0.834	Good
Leadership for Learning	6	0.813	Good
System Connection	6	0.832	Good
Embedded System	6	0.882	Good
OVERALL CA	38	0.813	Good

4 Conclusions

The goal of this paper is to address learning enablers of the learning in the Malaysian Armed Forces. The literature review exercise identified the appropriate learning enabler dimensions and the corresponding. However, given that these constructs were originally developed for business organizations and non-military organizations, further validation was conducted, and the results showed that these constructs were found to be relevant. In addition, the corresponding scales were also revised and the validation exercise showed that validity scores were highly reliable. This research therefore focuses

on the fact that all seven constructs are key components of an organization's learning appreciation system. These seven constructs or enablers for learning are interrelated and influence the outcome of learning.

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