Senge's Learning Organization: Measurement and Validation of the Model within Thailand Context

*Author Email: abdulhakam.h@psu.ac.th

Abdulhakam Hengpiya [1]

Niloh Wea-U-Seng [2]

Samsoo Sa-U [3]

Abstract

Rational Substantial studies on Senge's (1990) learning organization model have focused on the conceptual understanding using a descriptive approach, whereas less empirical studies have been conducted to develop and validate its measure, especially in a culturally different context. Consequently, more research is essential to empirically explore and confirm the existing model and concept of a learning organization.

Objective This study aimed to represent a necessary step to measure and validate learning organization based on Senge's model framework in the cultural context of Thailand.

Methodology Participants were 308 teachers of Islamic private schools in Pattani province, southern Thailand. Exploratory factor analysis using Principle Component Analysis (PCA) was first performed to explore the theoretical constructs of Senge's learning organization model and then Confirmatory Factor Analysis (CFA) was conducted to test its hypothesized model.

Research Findings In the item development process, the researchers initially developed a 75-item pool of learning organizations, and these items were revised and reduced to 47 items after experts examined their content validity. The PCA resulted in a 27-item scale that measures five extracted dimensions of a learning organization, namely, personal mastery, team learning, shared vision, mental model, and system thinking. Findings also revealed acceptable internal consistency reliability for the overall scale and the five specific sub-scale of a learning organization. The CFA showed that the five identified dimensions consisting of 23 items indicated a good model fit.

[1] Ph.D. (Education), Assistant Professor, Lecturer, Faculty of Islamic Studies, Prince of Songkla University, Pattani Campus.

[2] Ph.D. (Education), Associate Professor, Lecturer, Faculty of Islamic Studies, Prince of Songkla University, Pattani Campus. Email: niloh.w@psu.ac.th

[3] Ph.D. (Education), Assistant Professor, Lecturer, Faculty of Islamic Studies, Prince of Songkla University, Pattani Campus. Email: samsoo.s@psu.ac.th

Applications The results of this study provided strong evidence that the five disciplines of Senge's learning organization model can be operationalized and measured in Thai school contexts. And this developed measurement may provide good indicators for school administrators and educators who want to measure their schools' practice of learning organization, especially in Thailand's Islamic private schools setting.

Keywords: *Measurement, Validation, Learning Organization*

Introduction

Turbulent change and intense competition dueto technological advancement and the knowledge-based economy (Song, Joo, & Chermack, 2009) have dramatically changed the working environment and brought a new challenge to organizational members. The environmental changes and the present challenge encountered by the organization have made learning a success factor more important than ever (Wang, Tolson, Chiang & Huang, 2010). Correspondingly, the organizational members need to understand the cultures, values, knowledge, and skills that are relevant to the changes and development that are happening in the organization. Previous researches suggested that the link between individual and organizational learning becomes a pressing concern, and the organization needs to learn to survive and flourish (Pedler, 1995; West, 1994; Senge 1990). Spicer and Sadler-Smith (2006) asserted that organizational

learning is considered as a core capacity of an effective organization and a key component of a strategy for organization renewal. According to Budihardjo (2013), to win the tough competition in today competitive environment, organizations must be professionally managed and they should create an organizational learning climate to support their members to achieve high performance. Hitt (1995) believed that organizations must achieve excellence to survive, and excellence is achieved through the creation of the learning organization.

With the impacts of increasing competition, globalization, and environmental changes in the present day, like other organizations, schools are faced with challenges to develop and maintain their members to stay relevant and competitive on the global front if they are to survive and remain stable. In response to the need for developing schools corresponding to the

changing environment and global inter dependency, Thailand's National Education Act, the Amendment (Fourth National Education Act) B.E. 2562 (2019) (Ministry of Education, 2019), section 7 places high emphasis on organizing learning process that shall aim at attaining the following learning outcomes, namely, self-reliance and creativity, thirst for knowledge, and the capability of self-learning. Besides, section 8 of the Act lays great stress on developing educational provision that shall be based on lifelong education for all and continuous development of the bodies of knowledge and learning process. In the context of Islamic private schools, the implementation of the policy of integration of Islam in education curricula is the primary function of the schools. The growing popularity of the schools in the southernmost border provinces of Thailand is mainly due to the success of their integration effort (Wea-Useng, Wanichsuphawong, Narongraksakhet, Yeesun song, & Ruyani Baka, 2007). However, developing skills for implementing such integrated Islamic education remains a challenge for the schools. Thus, schools should focus on personnel development by introducing in-service training, workshops, research and development, and seminars to help prepare school personnel to take on a great responsibility to serve the needs of Muslims and improve a quality integrated Islamic education (Yala Rajabhat University, 2006). To achieve the mentioned results, schools need to create desirable environments such as empowerment, higher-trust culture, shared vision, teamwork, participation, and a continuous learning climate. Following this, members of schools must be well informed, flexible, and supported as well as be equipped to create values, knowledge bases, skills, processes, and systems. Such new environmental demands imply a departure from traditional structures and processes which are inflexible and hierarchical. Being in that new environment and climate, school personnel can engage in continuous learning which may result in what is now known as a learning organization. According to Sulphey (2015), a learning organization is a consciously managed organization in which "learning" becomes a vital component of its values, visions and goals, and everyday operations. Thus, the organization that facilitates the learning of all its members and constantly transforms itself can be considered as a learning organization (Pedler, Burgoyne, & Boydell, 1991). Given the significance of learning organization, in which its

practice can lead to organizational development and growth, thus it would be undeniable that today schools need to pay great attention in their attempts to create the working reality of such desirable attributes as shared vision, teamwork, collaboration, and collective learning. These attributes cannot be left mere theoretical knowledge and conceptual understanding, rather they should be empirically tested to explore school achievement in producing the mentioned attributes, represented as key elements of organizational learning.

A comprehensive review of the literature conducted by Hengpiya, Wea-Useng, & Sa-U (2021) revealed that most previous studies have used the existing learning organization questionnaire developed based on Watkins and Marsick' s (1993, 1996, 1999) model. And it was then followed by the questionnaire developed based on Senge's (1990) and Marquardt's (1996) model, respectively. With the availability of the Dimensions of Learning Organization Questionnaire (DLOQ) developed by Watkins and Marsick (1997), many previous studies have sought to employ DLOQ in measuring learning organization. To date, several studies have been conducted to examine the validity and reliability of DLOQ in several cultural contexts/settings, such as in Germany (Kortsch & Kauffeld, 2019), Greece (Goula, Stamouli, Latsou, Gkioka, & Sarris, 2020), Iran (Sharifirad, 2011), Lebanon (Chai & Dirani, 2018), Rwanda (Mbassana, 2014), Turkey (Basim, Sesen, & Korkmazyurek, 2007) and Thailand (Pimapunsri, 2008). While there have been far fewer studies conducted to construct and validate Senge's learning organization model (e.g., Park, 2006; Brasco, 2008; Khasawneh, 2011; Najafbagy & Doroudi, 2010) and this may be due to the non-availability of learning organization measurement developed by Senge (1990). Senge (1990), a founder of learning organization concepts, has only proposed theoretical knowledge and conceptual dimensions of learning organization without developing its measure, and most studies on Senge's learning organization model tend to be descriptive approach (e.g., Reese, 2019; Luhn, 2016; Caldwell, 2012; Hitt, 1995), rather than solid empirical research to develop its measurement. Therefore, there is a dearth of research devoted to systematically develop and validate learning organizational measurement based on Senge's (1990) model in a different cultural context. This study represents a necessary step to develop a

psychometrically sound instrument for measuring the constructs of Senge's (1990) learning organization model across culturally different populations. In addition, the study would be a valuable attempt to examine the extent to which the learning organization concept based on Senge's (1990) model, which originated and evolved in the United States of America, can be applicable in Thai school settings.

Objectives of the Study

The efforts to measure and validate the learning organization in a different cultural context are still rare. Accordingly, this study aimed to address the gap in the literature by empirically developing and validating learning organization measurement based on Senge's (1990) learning organization model in Islamic private schools, southern Thailand. To verify the construct validity of the measurement, Principle Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) were examined.

Literature Review

To address the objectives of this study, two domains of literature were reviewed: the concept of a learning organization and Senge's (1990) learning organization model.

Concept of a learning organization: A review of the literature on learning organization revealed that the term "learning organization" has been defined in several different ways. Senge (1990), for example, defined a learning organization as an "organization where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where the people are continually learning how to learn together". Garvin (1993) described learning organization as "an organization skilled at creating, acquiring, interpreting, transferring, and retaining knowledge, and at purposefully modifying its behavior to reflect new knowledge and insights". Pedler, Burgoyne, and Boydell (1991) saw it as an organization that facilitates the learning of all its members and continuously transforms itself. Steiner (1998) described a learning organization as "an organization that is continually expanding its capacity to create its future". Ortenblad (2004) viewed the learning organization as a process that needs effort and the change of behavior of organizational members to be a requisite for the learning organization. As noted above, even scholars have given different definitions to the learning

organization, but common to all is that learning organization is the organization that promotes learning by creating sharing, participating, and collaborating learning environments as a way to make effective change (Ortenblad, 2004; Senge, 1990; Watkins & Marsick, 1996). Daniels (1994) proposed three key characteristics of a learning organization as follows: an organization that 1) values individual and organizational learning, 2) involves all its members in continually reflecting in the process of continual improvement, and 3) structures work that allow continuous learning of its members. Thus, when the concept of a learning organization is defined the terms such as competence, continuous learning, collaboration, and organizational improvement will probably stay popular indefinitely.

Concerning the dimensions of learning organization, Senge (1990) proposes five key disciplines of the learning organization. They are personal mastery, mental model, shared vision, team learning, and system thinking. Garvin (1993) defined five key management practices of a learning organization, namely, systematic problem solving, experimentation, building on past experience, learning from other organizations, transferring knowledge. According to Marsick and Watkins (2003), the learning organization consists of seven dimensions, namely, 1) continuous learning, 2) inquiry and dialogue, 3) collaboration and team leaning, 4) systems to capture learning, 5) empower people, 6) connect the organization, and 7) provide strategic leadership for learning. Marquardt (1996) identified five interrelated learning subsystems of the learning organization that are necessary to sustain viable, ongoing organizational learning and ensuring organizational success, they are, learning, organization, people, knowledge, and technology. Pedler, Burgoyne, and Boydell (1991) identified eleven areas through which learning organization occurs: 1) a learning approach to strategy, 2) informing, 3) participative policy-making, 4) Internal exchange, 5) formative accounting and control, 6) boundary workers as environmental scanners, 7) enabling structures, 8) reward flexibility, 9) Inter-company learning, 10) self-development opportunities for all, and 11) leaning climate.

Senge's (1990) Learning Organization: Peter Senge (1990) is the author of several books and articles linked to the learning organization and his seminal book is "The Fifth Discipline: The Art and Practice of the Learning Organization". This book lays a great

foundation from which organizations can have the opportunity to grow and prosper and transfer itself to become a learning organization. According to him, the five disciplines must be practiced, otherwise, nothing will be learned and he viewed that the organizations that can survive in a constantly changing environment are those that are flexible, adaptive, and productive. For this to happen, organizations need to find a way on how to enhance people's commitment and develop their capacity to continually learn (Senge, 1990). The five disciplines identified are believed to be converging to innovate the learning organization. They are as follows. System thinking is the process of thinking holistically, ensuring that all decisions are made with consideration of an organization's environment, obligations, and limitations (Brasco, 2008). People who have systematic thinking can look at things from a holistic viewpoint or develop an understanding of the whole rather than small/fractional unrelated manageable parts. A shared vision means an organization whose members create a common vision that helps them move in the same direction, at the same rate. To have an organizational shared vision, the vision must not be created by the leader, rather it is created by group interaction in the organization. Senge (1990) states that when organizational members truly share a vision they are connected and bound together by a common aspiration. Team learning is "the process of aligning and developing the capacity of a team to create the results its members truly desire" (Baines, 1997). Team learning occurred when people engage in dialogue and can work together as a team by helping and supporting each other and they are united and friendly with everyone. Mental models refer to a framework for the cognitive process of people's minds and it determines how people think and act (Baines, 1997). People who have mental models can challenge their own assumptions and views of the current reality. Personal mastery relates to individual learning which is regarded as the foundation for building a learning organization. It refers to "a readiness to renew continually personal learning and to relate this to organizational work" (Haque, 2008). People who possess a personal mastery will continually enhance their capabilities to create the desired results and will never end in their thirst for self-discovery and self-improvement (Taggart, 2010).

Methodology

Participants: The participants were 308 teachers who teach general subjects in nine secondary Islamic private schools in Pattani province, southern Thailand. This study randomly splits the participants into two sample groups: one group consists of 100 cases (n = 100) for the exploratory factor analysis using PCA with varimax rotation procedures. Gorsuch (1983) recommended five cases per item, and with a minimum of 100 cases, regardless of the number of items would be adequate samples for conducting factor analysis. Another group consisting of 208 cases was used (n = 208) for the CFA. Researchers suggested that at least 200 subjects are adequate for CFA (e.g., Curran, Bollen, Chen, Paxton & Kirby, 2003; Hu & Bentler, 1999).

Most participants in this study were respondents whose age was between 26-40 years, consisting of 218 (71%) respondents, representing almost three-fourths of the participants, while the rest consisting of 90 (29%) respondents were aged between 20-25 years old and from 41 to above 50 years. Female outnumbered male respondents, equaling 71% and 29%, respectively. Almost all of respondents 292 (95%) were bachelor degree holders, while the rest equaling 16 (5%) were master and lower than bachelor degree holders. They were 107 (34%) and 108 (35%) respondents who have 1-5 and 6-10 years of teaching experience, respectively. Each group represented approximately one-third of the entire participants. The 43 (13%), 14 (%), and 36 (11%) respondents had 11-15, 16-20, and above 20 years of teaching experience, respectively.

Item development process: One of the most important steps in the research process is the development of items and the examination of their quality to ensure that they can measure what it is supposed to measure. In item development, we extensively relied on DeVellis's (2003) guidelines in scale development. The followings are steps of the item development process.

1) Examining documents and previous researches that are related to the concept and theory of learning organization (e.g., Senge, 1990; Pedler, Burgoyne, and Boydell, 1991; Watkins & Marsick, 1993, 1996, 1999; Marquardt, 1996; Ortenblad, 2004; and Brasco, 2008).

2) Determining the scope of the variables be measured. We developed the scope of content and dimensions of learning organization using Senge's (1990) learning organization model as a theoretical framework.

Five disciplines associated with learning organization as proposed by Senge (1990) were examined in this study. These five disciplines are operationally defined as follows; 1) system thinking means school personnel who have the discipline to look at things systematically and holistically. They can see and link organizational subsystems to help make an effective organizational change, 2) shared vision means school personnel create a common attitude, have clear and shared goals that can help them to head in the same direction, at the same rate, 3) team learning refers to the exchange of knowledge, experiences, and skills among the personnel to develop the wisdom and capacity of the team, 4) mental model means the personnel who have ideas, perceptions, and beliefs gained from their learning and experience with the surrounding environment, and with these human assets, they can create a conceptual framework consistent with the changes occurring in society, and 5) personal mastery means school personal who are continually active to pursue learning new things to develop their personal abilities and competences and they can create the results they seek.

3) Developing items for measuring learning organization. In developing items, we adapted and modified the Learning Organization Survey for School (LOSS) developed by Brasco (2008) to make them best suited for the study context. At the initial stage, we constructed a 75-item pool of learning organization scale.

4) Assessing face validity of the developed items. The 75–item pool was reviewed by three experts, consisting of a Ph.D. degree holder, an assistant professor, and an associate professor. They were required to give comments and suggestions for item revision. The evaluation through face validity revealed a logical tie between the items and the variables to be measured. However, the removal of some items was necessary because of their lack of clarity and trivial item redundancy. Further, we added new items to the scale to make it comprehensive that cover the scope of content to be measured. Experts have suggested including the words "exchange", and the statement "respect between the new generations and the elders" in the measurement. Accordingly, we made item modifications as follows; "school personnel exchange ideas and knowledge to develop organizational wisdom", and "the school creates a mutual respect and dignity between the new generations and the elders". Few

other items seemed to be ambiguous, and they do not reflect the actual phenomena occurring in schools. For example, the statement: "I avoid making a self-determination and participate in examining the nature of problems" was suggested by experts to revise it into a new one, which said: "When a problem arises, I would not decide to solve it by myself, but to think and understand it". After making item revision, deletion, and refinement, 47 items that measure learning organization were retained. These items were rated on a five-points Linkert scale from strongly disagree (1) to strongly agree (5).

　　5) Examining content validation of the scale. Three expert judges, who have vast experience in research, as shown by their work publications, were asked to rate the congruency between items and their respective dimensions of learning organization using indexes of Item-Objective Congruence (IOC). The results of IOC analysis revealed that the experts were unanimous in their response for item-dimensions congruence. Thus, the items after being reviewed were compatible with the preceding item structure model. Further, construct validity using exploratory and confirmatory factor analyses is examined and presented in a later section.

Results

　　This section presented the results of exploratory and confirmatory factor analyses. In addition, Cronbach's coefficient alpha and descriptive statistics were reported. The results of this study were as follows.

　　Exploratory Factor Analysis: Prior to performing exploratory factor analysis using PCA with varimax rotation, we assessed the suitability of the data for the first half of the sample (n=100). The Kaiser-Meyer-Oklin (KMO) value reached .91, meeting the recommended value. Hair, Black, Babin, Anderson & Tatham (2006) recommended the KMO value of at least .70. And the value of Bartlett's test of sphericity was statistically significant ($p < 0.05$), proving the factorability of the correlation matrix. This study set three predetermined criteria of reliable factors to be extracted or retained: 1) an eigenvalue of each factor is equal to or greater than 1, 2) factor loadings are equal to or above 0.50 (Hair et al. 2006), and 3) each factor consists at least 3 items. Friendly (1995) proposed that it is better to have at least 3-5 items to measure each factor. The analysis with a varimax rotation extracted a five-factor solution of the learning organization with 27 items that loaded strongly on each factor. The

resulting pattern factor matrix of the rotated solution is presented in Table 1.

Based on the predetermined criteria of reliable factors, there were seven items, namely PM1, PM4, PM5, PM6, PM7, PM8, and PM9 which loaded significantly on factor I. These seven items share one common concern which is about learning to expand personal capacity to create the desired results. Thus, this factor was labeled as "Personal Mastery". The factor loadings also revealed that the items which represent "Team Learning", namely TL1, TL2, TL3, TL5, TL6, and TL7 loaded significantly on factor II, which highlights the need for collaborating to work and develop knowledge effectively in a team. Factor III contains the following items: SV1, SV2, SV3, SV4, and SV7. These five significant items indicate that school personnel all work together to hold a shared picture or vision for the future of the school, thus were labeled as "Shared Vision". Factor IV was named a "Mental Model", which consists of the following items: MM1, MM2, MM3, MM4, and MM6. These items have a common concern that represents what school personnel believe can and cannot happen within the school and how they shape their decisions and actions. Four items were grouped under factor

V, namely, item ST2, ST5, ST6, and ST7 and they share one common concern that focuses on seeing the whole picture in dealing with the problems and practices in the school and understanding the interrelationships of the school subsystem to make an effective school change. This factor was labeled as "*System Thinking*"

The emergent 5-factor structure was verified by eigenvalue in which all five factors have an eigenvalue greater than 1. The percentage of variance explained for factors I, II, III, IV, and V was 51.23%, 6.73%, 4.11%, 3.69%, and 2.78%, respectively. The factor matrix result shows that the common factor solution accounted for 68.54% of the total variance explained, which is considered acceptable for a social science study (Hair et al., 2006). Descriptive statistics reported by mean and standard deviation score ranged between 3.81 – 4.00 and .74 - .84, respectively, for the five factors that coincide with the five disciplines (i.e., personal mastery, team learning, shared vision, mental model, and system thinking). Cronbach's coefficient alpha was ranged from .87 to .92 for the five factors. Table 1 presents the results of the mean, standard deviation, and internal consistency

Table 1: Factor Loadings for Leaning Organization, mean, standard deviation, and Cronbach Alpha

	Item	Factor Loading				
		I	II	III	IV	V
PM1	I am committed to lifelong learning.	.67				
PM4	I learn from my mistake to improve performance.	.79				
PM5	I am looking for new skills and strategies related to teaching and learning management to help students learn at all times.	.66				
PM6	I take advantage of every opportunity to improve my performance.	.75				
PM7	After completing each task, I will always study the causes of success and failures to develop my potential.	.69				
PM8	I spend time learning more about things that are related to my work.	.71				
PM9	I have a vision of the future of what is important and possible for myself and the organization.	.67				
MM1	Personnel always consider other decisions made before and their results.				.68	
MM2	When a problem arises, I would not decide to solve it by myself, but to think and understand it.				.64	
MM3	Personnel are provided with opportunities to reflect on their work during the school day.				.72	
MM4	I am encouraged to share new ideas with my colleagues.				.60	
MM6	Personnel always consider the decisions of others in similar situations and their results.				.71	
SV1	Participation of personnel in identifying the school's common norms, values, and beliefs.			.70		
SV2	Personnel openly discuss the school's values, mission, and goals.			.71		
SV3	Personnel act on the school's values, mission, and goals.			.69		
SV4	Personnel align their vision across different workgroups of the school.			.71		
SV7	I attach great importance to the school's vision.			.62		
TL1	School personnel work collaboratively.		.69			
TL2	School personnel exchange ideas and knowledge to develop organizational wisdom.		.63			
TL3	All personnel collectively share their experiences, practical abilities, and work skills.		.66			
TL5	Whenever personnel state their view, they also ask what others think.		.63			
TL6	Personnel view problems of teamwork as an opportunity to learn together.		.73			
TL7	Personnel are encouraged to ask "why" regardless of rank.		.64			
ST2	Personnel use feedback from stakeholders such as students, teachers, administrators, school committees, parents, and communities to predict challenges that may affect the school.					.62
ST5	Personnel understand that they are one of the people who play a role in the school change process and cannot be removed from it.					.74
ST6	Personnel look at the differences between what is actually being done and what is expected and act to correct the differences.					.69

ST7 Personnel understand that changes to one part of the school might affect and be affected by other parts of the school.					.68
Scale Mean	4.00	3.88	3.88	3.86	3.81
Scale Standard Deviation	.79	.84	.82	.75	.74
Cronbach Alpha	.92	.92	.91	.87	.87
Eigenvalues	21.00	2.76	1.68	1.51	1.14
Percentage of variance explained	51.23	6.73	4.11	3.69	2.78
Cumulative variance explained	51.23	57.96	62.06	65.75	68.54

Note: PM = Personal Mastery, MM = Mental Model, SV = Shared Vision, TL = Team Leaning, ST: System Thinking: Only factor loadings > .05 are displayed.

reliability for each subscale score (Cronbach Alpha).

Confirmatory Factor Analysis (CFA): In CFA, we subjected the 27-item scale to a new factor analysis using the remaining half of the sample (n=208). Prior to the analysis, examining Mahalanobis distance was conducted and the result revealed that one case had P-value less than .001 indicating a multivariate outlier, and this identified case was deleted from the analysis. Thus, a sample of 207 was employed for CFA. This analysis was performed on hypothesized five dimensions of learning organization using the Analysis of Moment Structure (AMOS) (Arbuckle, 2006) model-fitting program.
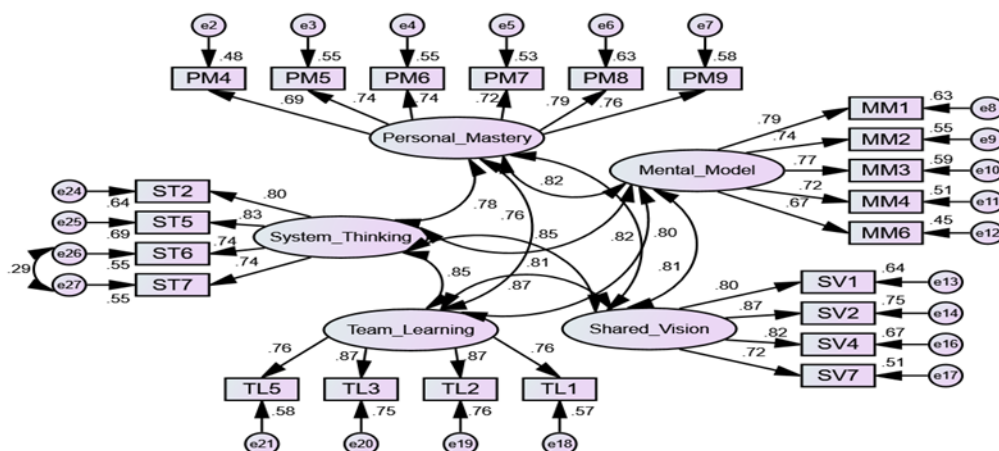
The first result of CFA of the hypothesized model showed that the model was inadequate fit as one of the fit indices, which is Norm Fit Index (NFI) falls below the recommended value. To improve the model fit and make it correspondent to the underlying

theory, we made model re-specification through deleting some items whose data fail to meet normality assumption, which consists of the following items: PM1, TL7, TL7, and SV3. The initial developed 27 items were further reduced to 23 items. In addition, model re-specification was done by correlating some measurement errors based on the suggestion provided by modification indices' (MI) values. Accordingly, the error in measuring the twenty-sixth item (e26) was correlated with the error in measuring the twenty-seventh item (e27). The NFI and other fit indices of the model increased after model re-specification. The result of CFA showed that the chi-square ($\chi2$), degree of freedom (df), and probability level (p) were achieved at 279.41, 219, and .00, respectively. A significant value of the chi-square test indicates that the model does not adequately fit the data. The chai-square test should not be significant if there is a good model fit (Hengpiya, 2008). However, it has been noted that the chi-

square statistic is highly sensitive to or inflated by sample size and departures for multivariate normality (Bollen, 1989; Tanaka, 1993). This statistic is easy to reject the model fit as the sample size increases (Hashim, 2008). In this study, we report the chai-square test merely for informative purposes. Thus, examining multiple fit indices was essential to verify a model fit (Hair et al., 2006).

The final revised model resulted in a satisfactory model fit (see Figure 1), having the goodness-of-fit indexes as follows; chai-square/df ratio ($\chi2$/DF) and Root Mean Square Error of Approximation (RMSEA) were 1.276 and .04, respectively. The value of $\chi2$/DF and RMSEA falls well below the maximum recommended value of 3 (Marsh & Hocevar, 1985) and .05 (Marsh & Hau, 1996; Browne & Cudeck, 1993), respectively. And Goodness of Fit Index (GFI), Adjusted Goodness of Fit

Goodness of Fit: Chi-square = 279.406; DF = 219; P-value = .004; Chi-square/df ratio = 1.276; GFI = .897; AGFI = .871; CFI = .980; TLI = .977; NFI = .916; RMSEA = .037

Figure 1: Measurement Model for Learning Organization

Index (AGFI), Comparative Fit Index (CFI), Norm Fit Index (NFI), and Tucker Lewis Index (TLI) were .90, 87, .98, .92, and .98, respectively. These indexes take values from 0 to 1: the closer the value is to 1, the better the fit of the model. Marsh & Hau (1996) recommended that GFI and AGFI should be more than .90. According to Baumgartner & Homburg (1995) and Doll, Xia, & Torkzadeh (1994), GFI or AGFI scores in the .80 to .89 range represent a

reasonable fit; scores of .90 or higher are considered evidence of good fit. A value of more than .90 for CFI (Bentler, 1990), NFI (Bollen, 1989), and TLI (Bentler & Bonett, 1980) is recommended, and this value is prevalently used in research to prove a good model fit. Examining fit indexes against their respective recommended values, the model fit of the present study was established as all goodness-of-fit indexes fall within the acceptable ranges. Thus, the results of this study lend reasonable support for the confirmation of the proposed model of five dimensions of the learning organization.

Discussion

The findings provided evidence about the use of learning organization based on Senge's model in Islamic private schools, Pattani province. The emergence of personal mastery was reflected in the engagement of school personnel in learning to improve their capacity and performance. This study confirmed Yonsungnoon's (2011) findings which indicated the emergence of personal mastery in basic education schools under the Ministry of Education and schools under the Ministry of Interior, Thailand. The personal mastery which was evident in the schools was not uncommon because they were affected by

Thailand's Twelfth National Economic and Social Development Plan (2017-2021) (Office of Prime Minister, 2017) and the National Scheme of Education (2017-2036) (Ministry of Education, 2017) which emphasize the development of people's potentials. Under these educational policies, school personnel were required to improve their capacity to operate education according to the standards and indicators specified in the school curriculum and to improve their work performance to gain a competitive advantage and keep pace with rapid changes in Thai society. Further, in the Islamic school context, the realization of the importance of learning among school personnel may be attributed to Islamic inspiration in which the Qur'an makes a strong provocative question: هَلْ يَسْتَوِي الَّذِينَ يَعْلَمُونَ وَالَّذِينَ لَا يَعْلَمُونَ " Are those who know equal to those who know not?" (Az-Zumar, 9) (Ali, n.d.).

With regard to team learning, the data reported that school personnel learn about their learning together and they take time to reflect what each person understands about the learning they have created collectively. This finding was congruent with the previous study conducted by Paranapan and Sirisunhirun (2013) who reported that team learning as the main characteristic of learning

organization was practiced by officers of the Faculty of Graduate Studies, Mahidol University. The emergence of team learning may be attributed to school recognition of the importance of sharing ideas and information which can lead to the creation of creativity and unity in the team. In addition, collaborative learning can motivate people to continually develop their potentials.

The results also showed that schools create a shared vision by way of involving school personnel to work together to define their goals and beliefs to create the future of the schools. This finding was consistent with Yonsungnoon's (2011) study whose results supported the existing shared vision in Thailand's schools. The emergence of this dimension may be because the school administrators recognize the importance of getting everyone in a school to understand what the school is trying to do and logically when this occurred, the sense of ownership and work commitment increases.

The results also prescribed that the schools used a mental model which was reflected in how school personnel think and act. This study was supported by Park's (2006) study whose findings provided evidence of the similar learning organizational practice

in Korean vocational high schools. The emergence of this domain may be attributed to the significance of the mental model itself in which the school personnel may well be aware of the extent to which this type of learning organization influences perception and interpretation of data collected and actions the schools are taking.

Further, the finding showed that the school personnel developed thinking and an understanding of the whole rather than just fractional parts of structures and processes. This study confirmed Brasco's (2008) findings in which they revealed that Catholic schools in the state of Florida also used system thinking as one of the learning organizational principles. System thinking was operationalized in Islamic private schools might stem from the realization of the schools about the importance of employing system thinking in the organization as it can make all school members see the whole school system or pattern more clearly and accordingly, they can make a better adjustment of a work plan. Thus, the schools encouraged personnel to create strategic thinking, quick thinking as well predicting the opportunities. Pannitanmai (2001) asserted that these three assets are important characteristics of system thinking.

Conclusion

The finding showed evidence of construct validity of the measurement of a learning organization, thus, the applicability of the measurement for the study context was supported. Five dimensions of learning organization were postulated based on Senge's (1990) learning organization model. They are personal mastery, team learning, shared vision, mental model, and system thinking. With this theoretical framework, behavioral phrased items were then developed to create a scale and were also reviewed by a panel of experts and reported to have logical content validity. Factorial validity of the scale was assessed by the PCA with varimax rotation procedures. The results of the pattern factor matrix yield 27 items measuring five reliable dimensions of learning organization for the local study, which is consistent with the previous theoretical model. The emergent five dimensions of learning organization were further confirmed by CFA when the overall indices indicate a good model fit. The CFA confirms that 23 items precisely detected the theorized constructs.

This study contributes to the body of assessments by confirming that the scale measuring Senge's learning organization model produced a reliable and valid measure in the Thai school context. The previous studies on Senge's learning organization have extensively focused on theoretical understanding (e.g., Reese, 2020; Luhn, 2016; Caldwell, 2012; Hitt, 1995), rather than the construction and validation of its measure. Thus, this study has another contribution to fulfilling the existing gap that has called for a construct validation study. The results from face examination and factorial analyses supported that the developed measurement is a reliable and valid instrument for measuring learning organization. Therefore, this measurement can be employed by researchers who are interested in studying learning organizations in Thai schools' contexts. This measure may provide good indicators for school administrators and educators who want to measure their schools' practice of learning organization, especially in Thailand's Islamic private schools setting. Further research using different sample settings is encouraged for cross-validation evidence.

References

Ali, A.Y., (n.d.). *al-Qur'an' s Translation*. Retrieved June, 15, 2021, from https://tanzil.net

Arbuckle, J.L. (2006). *AMOS 6.0* (Computer software). Smallwaters.

Baines, A. (1997). Exploiting organizational knowledge in the leaning organization. *Work study, 46*(6), 202-206.

Basim, H.N., Sesen, H., & Korkmazyurek, H. (2007). A Turkish translation, validation and reliability study of the dimensions of the learning organization questionnaire. *World Applied Sciences Journal, 2*(4), 368-374.

Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International Journal of Research in Marketing, 13*(2), 139-161.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 1 0 7*(2), 238–246.

Bentler, P.M., & Bonett, D.G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*, 588-606.

Bollen, K.A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods and Research, 17*, 303-316.

Brasco, S. (2008). *The Relationship between Learning Organization Principles and Student Achievement in Catholic Schools*. Doctoral dissertation; Florida Atlantic University. Florida.

Brown, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In Bollen, K.A., & Long J.S. (eds.), *Testing structural equation models* (pp. 445-455). CA.

Budihardjo, A. (2013). Job satisfaction, affective commitment, learning climate and organizational effectiveness: A study on senior managers. *Third Annual International Conference on Business Strategy and Organizational Behavio*r. Retrieved August, 24, 2021, from https://www.proquest.com/openview/c73b8dea9bff55e72e5d5473a518e27f/1.pdf?pq-origsite=gscholar&cbl=1036377

Caldwell, R. (2012). Systems thinking, organizational change and agency: A practice theory critique of Senge's learning organization. *Journal of Change Management, 12*(2), 145-146.

Chai, D.S., & Dirani, K. (2018). *The Dimension of the Learning Organization Questionnaire (DLOQ): A Validation Study in the Lebanese Context*. Retrieved March, 12, 2021, from https://doi.org/10.1108/TLO-03-2016-0017

Curran, P.J., Bollen, K.A., Chen, F., Paxton, P., Kirby, J. (2003). Finite sampling properties of the point estimates and confidence intervals of the RMSEA. *Sociological Methods and Research, 32,* 208-252.

Daniels, S. (1994). The learning organization. *Work Study, 43* (8), 5-6.

DeVellis, R. F. (2003). *Scale Development: Theory and Application*. Newbury Park: Sage Publication.

Doll, W.J., Xia, W., & Torkzadeh, D. (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. *MIS Quarterly, 18*(4), 357-369.

Friendly, M. (1995). *Planning a Factor Analytic Study*. Retrieved August, 24, 2021, from http://friendly.apps01.yorku.ca/psy6140/fa/facplan.htm

Garvin, D.A. (1993). Building a learning organization. *Havard Busines Review, 71*, 78-91.

Gorsuch, R.l. (1983). *Factor Analysis* (2nd ed). Hillsdae, Erlbaum.

Goula, A., Stamouli, M.A., Latsou, D., Gkioka, V., & Sarris, M. (2020). Validation of dimensions of learning organization questionnaire (DLOQ) in health care setting in Greece. *Journal of Public Health Research, 9*(1962), 517-522.

Hair, J.F, Black, W.C, Babin, B.J. Anderson, R.E., & Tatham, R.L. (2006). *Multivariate Data Analysis* (6th ed.). Pearson Education Upper Saddle River.

Haque, M.M., (2008). *A Study of the Relationship between the Leaning Organization and Organizational Readiness for Change*. Doctoral dissertation; Pepperdine University.

Hashim, R. A., & Sani, A. M. (2008). A confirmatory factor analysis of a newly integrated multidimensional school engagement scale. *Malaysian Journal of Learning and Instruction (MJLI), 5*, 21-40.

Hengpiya, A. (2008). Construct validation of a school principal decision-making styles scale. Malaysian Journal of Learning and Instruction, *5*, 41-61.

Hengpiya, A., Wea-Useng, N., & Sa-U, S. (2021). *Development of Learning Organization Model for Enhancing Job Satisfaction and Work Motivation of Teachers in Islamic Private Schools in Pattani Province, Thailand* (Thai). Faculty of Islamic Sciences, Prince of Songkla University.

Hitt, W.D. (1995). The leaning organization: some reflections on organizational renewal. *Leadership and Organization Development Journal, 16*(8), 16-25.

Hu, L.T., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling: A Multidisciplinary Journal, 6*, 1-55.

Khasawneh, S. (2011). Learning organization disciplines in higher education institutions: An approach to human resource development in Jordan. *Innovative Higher Education, 36*(4), 273-285. Retrieved March, 4, 2020, from http://dx.doi.org/10.1007/s10755-010-9170-8

Kortsch, T., & Kauffeld, S. (2019). Validation of a German version of the dimension of the learning organization questionnaire (DLOQ) in German craft companies. *Zeitschrift fur Arbeits-und Organisation Spsychologie, 63*(1), 15-31.

Luhn, A. (2016). The leaning organization. Creative and Knowledge *Society/International Scientific Journal, 1*, 80-95.

Marquardt, M.J. (1996). *Building the Learning Organization: A Systems Approach to Quantum Improvement and Global Success*. McGraw-Hill.

Marsh, H.W., & Hau, K.T. (1996). Assessing goodness of fit: Is parsimony always desirable? *The Journal of Experimental Education, 64, 364-390.*

Marsh, H.W., & Hocevar. D. (1985). Application of confirmatory factory analysis to the study of self-concept: First and Higher-order factor models and their invariance across groups. *Psychological Bulletin, 97*(3), 562-582.

Marsick, V., & Watkins, K. (2003). Demonstrating the value of an organization's learning culture: The dimensions of the learning organization questionnaire. *Advances in Developing Human Resource, 5*(2), 132-151.

Mbassana, M.E. (2014). Validating the dimensions of the learning organization questionnaire (DLOQ) in the Rwandan context. *European Journal of Business, Economics and Accountancy, 2*(2), 15-26.

Ministry of Education. (2017). *The National Scheme of Education (2017-2036).* Retrieved August, 24, 2021, from https://edubrights.com/resource/2018/11/27/the-national-scheme-of-education-b-e-2560-2579-2017-2036/

Ministry of Education. (2019). *National Education Act of 2019 (Amendment, No. 4).* Retrieved August, 24, 2021, from https://www.kroobannok.com/createpdf.php?article_id=86627

Najafbagy, R., & Doroudi, H. (2010). Model of learning organization in broadcasting organization of Islamic republic of Iran. *Serbian Journal of Management, 5*(2), 213-225.

Office of Prime Minister. (2017). *Twelfth National Economic and Social Development (2017-2021).* Retrieved August, 24, 2021, from https://planipolis.iiep.unesco.org/en/2017/twelfth-national-economic-and-social-development-plan-2017-2021-6634

Ortenblad, A. (2004). The learning organization: Toward an integrated model. *The Learning Organization, 11*(2), 124-144.

Pannitamai, W. (2001). *Development of Learning Organization* (Thai). Exper Net.

Paranapan, K., & Sirisunhirun, S. (2013). Happy workplace, knowledge management and participation influencing the learning organization of the faculty of graduate studies, Mahidol University (Thai). *Journal of Educational Administration, Silpakorn University, 3*(2), 117-127.

Park, J.H. (2006). *Measurement and Validation of Senge's Learning Organization Model in Korean Vocational High Schools.* Doctorate dissertation, Graduate faculty of the University of Georgia.

Pedler, M. (1995). A guide to the learning organization. *Industrial and Commercial Training, 27* (4), 21-25.

Pedler, M., Burgoyne, J. & Boydell. (1991). *The Learning Company: A Strategy for Sustainable Development*. McGraw-Hill.

Pimapunsri, P. (2008). Factors affecting learning organization culture and hotel mangers' leadership styles in Thailand (Thai). *Educational Journal of Thailand, 2*(1), 34-43.

Reese, S. (2020). Taking the leaning organization mainstream and beyond the organizational level: an interview with Peter Senge. *The Learning Organization, 27*(1), 6-16.

Senge, P. (1990). *The Fifth Discipline: The Art and Practice of the Learning Organization*. Doubleday Qurrency.

Sharifirad, M.S. (2011). The dimensions of learning organization questionnaire (DLOQ): A cross-cultural validation in an Iranian context. *International Journal of Manpower, 32*(5/6), 661-676.

Song, J.H., Joo, B.K., & Chermack, T.J., (2009). The dimensions of leaning organization questionnaire (DLOQ): *A validation study in a Korean context. Human Resource Development Quarterly, 20*(1), 43-64.

Spicer, D.P., & Sadler-Smith, E. (2006). Organizational learning in smaller manufacturing firms. *International Small Business Journal, 24*(2), 133-158.

Steiner, L. (1998). Organizational dilemmas as barriers to leaning. *The Learning Organization, 5*(4), 193-201.

Sulphey, M.M. (2015). Construction and validation of learning organization questionnaire (LOQ). *Journal of Applied Management and Investment, 4*(1), 35-44.

Taggart, J. (2010). *The Five Leaning Discipline from Individual to Organizational Leaning*. Retrieved August, 12, 2021, from https://changingwinds.files.wordpress.com/2010/09/the-five-learning-disciplines.pdf

Tanaka, J.S. (1993). Multifaceted conceptions of fit in structural equation models. In Bollen, K.A., & Long J.S. (eds.), *Testing Structural Equation Models* (pp. 10-39). CA.

Wang, J., Tolson, H., Chiang, T.L., Huang, T.Y. (2010). An Exploratory factor analysis of workplace leaning, job satisfaction, and organizational commitment in small to midsize enterprises in Taiwan. *Human Resource Development International, 13*(2), 147-163.

Watkins, K.E., & Marsick, V.J. (1993). *Sculpting the Leaning Organization: Lessons in the Art and Science of Systemic Change*. Jossey-Bass.

Watkins, K.E., & Marsick, V.J. (1996). *In Action, Creating the Learning Organization*. Alexandria, VA: American Society for Training and Development.

Watkins, K.E., & Marsick, V.J. (1997). *Dimensions of the Learning Organization, Partners for the Learning Organization*. Warwick, RI.

Watkins, K.E., & Marsick, V.J. (1999). Sculpting the leaning community: New forms of working and organizing. *National Association of Secondary School Principals: NASSP Bulletin, 83*(604), 78-87.

Wea-Useng, N., Wanichsuphawong, P., Narongraksakhet, I., Yeesunsong, A., & Ruyani Baka, M. (2007). *Educational Managements of Islamic Private Schools in Three Southern Border Provinces of Thailand* (Thai). Prince of Songkla University, Pattani Campus.

West, P. (1994). The concept of the learning organization. *Journal of European Industrial Training, 18* (1), 15-21.

Yala Rajabhat University. (2006). *Strategic Proposals for Quality Development of Islamic Private Schools* (Thai). This research is funded by the Office of the Higher Education Commission (Thailand).

Yonsungnoon, J. (2011). Analysis of factors affecting basic education institution becoming learning organizations (Thai). *EAU Heritage Journal, 1*(1), 31-41.