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Development of Indicators for Organizing Learning Based on Community Context to Ensure the Quality of Education at the Basic Education Level: Confirmatory Factor Analysis

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Abstract

This study aimed to development of indicators for organizing learning based on community context to ensure the quality of education at the basic education level: Confirmatory factor analysis and to test the goodness-of-fit of the structural equation model of indicators for organizing learning based on community context. The sample consisted of 117 teachers from schools under the jurisdiction of the Pattani Primary Educational Service Area Office 1, selected proportionally based on their subject areas. Data were collected using a 21-item, five-point Likert scale questionnaire. Content validity was verified by five experts, with Item-Objective Congruence (IOC) values ranging from 0.80 to 1.00. The overall instrument demonstrated high reliability, with a Cronbach's alpha coefficient of 0.961. Data analysis employed confirmatory factor analysis (CFA). The findings revealed that organizing learning based on community context management comprises four components with a total of 21 indicators: (1) Concrete experience (CE), (2) Reflective observation (RO), (3) Abstract conceptualization (AC) and (4) Active experimentation (AE). The empirical data demonstrated good model fit, as indicated by the following fit indices: x^2 = 262.80, df = 186, p < 0.001; GFI = 0.99; AGFI = 0.90; SRMR = 0.07; RMSEA = 0.06; p-value for test of close fit = 0.99; NFI = 0.98; IFI = 0.99; CFI = 0.99. The standardized factor loadings for each indicator ranged from 0.71 to 0.93. Drawing upon the results of this study, the following recommendations are presented to guide further research should be conducted in diverse contexts and with more varied samples and investigate the outcomes of implementing the developed indicators in real educational settings.

Keywords: Confirmatory factor analysis, Organizing learning based on community context management, Quality assurance

Introduction

Organizing learning based on community context management is a pedagogical strategy or model that integrates curriculum content with real-world community contexts. This approach fosters learning through hands-on engagement in authentic community situations, facilitated by collaborative participation among teachers, students, and community members. It comprehensively promotes student development in diverse knowledge and skill sets. Both the community and the learners mutually benefit, achieving both curriculum objectives and community-defined goals. (Panich, 2014, as cited in Thongkhao, 2018; Ritthikup, 2018). According to Rittikhup (2018), synthesized organizing learning based on community context management into three distinct phases: planning and preparation, implementation and evaluation. Each phase inherently incorporates community-based learning experiences, reflective learning/review, knowledge synthesis and

practical application of knowledge, consistent with Kolb's experiential learning theory. (adapted from Bedri *et al*., 2017; Kolb & Kolb, 2017).

Thailand's Criteria and Methods for Educational Quality Assurance B.E. 2553 (2010) emphasizes student-centered pedagogy, mandating instructional design that fosters critical thinking, problem-solving, and technology integration, alongside dynamic interaction among students, teachers and community stakeholders (Office of the Education Council, 2014). However, the Demonstration School of Prince of Songkla University (Primary Division), overseen by the Ministry of Higher Education, Science, Research and Innovation, customizes its quality assurance. Its internal and external assessment criteria are jointly determined with the Faculty of Education, aligning indicators with the school's unique vision and mission, rather than adhering to OBEC standards.

Identifying indicators for organizing learning based on community context management is crucial for enhancing educational quality, informing evaluation, policy and strategic planning. A confirmatory factor analysis (CFA) was thus conducted to assess a community-based learning management model's consistency with empirical data. Findings from this research can be applied to improve curricula and institutional performance indicators at the Demonstration School of Prince of Songkla University (Primary Division), which develops its own internal quality assessment metrics.

The development of organizing learning based on community context management indicators was grounded in Kolb's experiential learning theory (adapted from Bedri *et al*., 2017; Kolb & Kolb, 2017). The effectiveness of the indicators was examined using Confirmatory Factor Analysis (CFA).

Objectives

1. To develop indicators for organizing learning based on community context management.

2. To examine the goodness-of-fit of the structural equation model of the indicators for organizing learning based on community context management.

Research Methodology

Population and Sample

1. The population in this study consisted of 814 teachers from schools under the jurisdiction of the Pattani Primary Educational Service Area Office 1 who were teaching during the 2024 academic year. A proportional stratified random sampling method was employed, with the sample size set at 15% of the total population, based on Cochran's formula (Cochran, 1977). The calculation resulted of 122 sample.

2. The sample group was determined in accordance with the recommended sample size for Confirmatory Factor Analysis (CFA). 117 out of a sample of 122 completed the questionnaire. (95.90%), proportionally representing the different subject areas they were assigned to teach.

Research Instruments

For this study, a questionnaire was developed to collect data, drawing on theories and literature related to organizing learning based on community context management. It consisted of two sections.

Section 1: General information

Section 2: Organizing learning based on community context management

This section was designed based on Kolb's experiential learning theory, encompassing four stages consists of Concrete experience (CE), Reflective observation (RO), Abstract conceptualization (AC) and Active experimentation (AE) It consisted of 21 closed-ended items, each rated on a 5-point Likert scale:

5 = Extremely important
4 = Very important
3 = Moderately important
2 = Slightly important
1 = Not Important at all

Scoring and Interpretation

The responses were analyzed by calculating the arithmetic mean for each item. The interpretation of the mean scores was based on equal interval ranges, determined by dividing the scale range (5 – 1 = 4) by the number of desired categories (5), resulting in an interval width of 0.80. The interpretation criteria were as follows:

4.21 – 5.00: Highest level of perceived importance
3.41 – 4.20: High level of perceived importance
2.61 – 3.40: Moderate level of perceived importance
1.81 – 2.60: Low level of perceived importance
1.00 – 1.80: Lowest level of perceived importance

Instrument Quality Validation

All questionnaire items were subjected to content validity assessment using the Item-Objective Congruence (IOC) technique. The results indicated that the IOC values ranged from 0.80 to 1.00, suggesting a high level of content validity. The reliability of the questionnaire was assessed using Cronbach's alpha coefficient, which yielded a value of 0.961, indicating excellent internal consistency. The researcher has undergone human research ethics training and received certification REC Number: psu.pn. 2-078/67.

Data Analysis

The data analysis in this study was conducted in two main stages using JASP 0.18.3.0 programe.

1. Descriptive Analysis: General demographic data of the respondents were analyzed using descriptive statistics, including frequency and percentage.

2. Confirmatory Factor Analysis (CFA): was performed to validate the organizing learning based on community context management model among teachers in Pattani Primary Educational Service Area Office 1, assessing its fit with empirical data.

Results

Table 1 General Information of the Respondents

General information of the respondents	Frequency	Percentage
Gender		
Male	18	15.38
Female	99	84.62
School size		
Small size (1-120 students)	12	10.26
Medium size (121 – 600 students)	103	88.03
Large size (> 600 student)	2	1.71

Table 1 (continued)

General information of the respondents	Frequency	Percentage
Academic rank		
Without a professional	51	43.59
Professional Level	14	11.97
Specialist	51	43.59
Expert	1	0.85
Specialized Expert	0	0.00
Teaching experience		
<2 years	6	5.13
2-4 years	9	7.69
5-7 years	11	9.40
>7 years	91	79.78
Primary subject taught		
Mathematics	11	9.40
Science and Technology	11	9.40
Thai Language	38	32.48
English Language	11	9.40
Social Studies, Religion, and Culture	12	10.26
History	2	1.71
Health and Physical Education	4	3.42
Vocational Education	7	5.98
Physics	4	3.42
Chemistry	6	5.13
Biology	2	1.71
Others	9	7.69
Grade level		
Grade 1 - 3	53	45.30
Grade 4 - 6	49	41.88
Grade 7 - 9	7	5.98
Grade 10 - 12	8	6.84

From Table 1, regarding the general information of the respondents, it was found that most respondents were female, accounting for 84.62%, followed by male respondents at 15.38%. In terms of school size, the majority of schools were medium-sized (121–600 students), representing 88.03%. Regarding professional rank, the largest proportion of respondents were either without a professional rank and Specialist, both at an equal frequency of 43.59%. In terms of teaching experience, most teachers had more than 7 years of experience, accounting for 79.78%. Regarding the main subjects taught, the majority of teachers taught Thai language, accounting for 32.48%. As for the grade levels taught, most respondents taught at the primary level (Grades 1–3), accounting for 45.30%.

Table 2 Results of the confirmatory factor analysis of the organizing learning based on community context management Model in Schools under the Pattani Primary Educational Service Area Office 1

Item	M	SD	Std. Factor Loading	SE	t	R^2	Meaning
Concrete Experience: CE							
CE1 Teachers collaborate in planning the selection of communities for student learning and exploration	4.15	0.62	0.72	0.03	21.66	0.51	High
CE2 Teachers hold a preparatory meeting before taking students to conduct learning activities in the community	4.07	0.77	0.76	0.03	25.56	0.57	High
CE3 Teachers explore prominent learning sources in the community to incorporate into lesson planning	4.27	0.62	0.75	0.02	25.56	0.55	Highest
CE4 Teachers develop the school curriculum based on the community context	4.17	0.65	0.82	0.02	28.11	0.66	High
CE5 Teachers provide opportunities for local experts to participate in the development of the learning curriculum	4.31	0.65	0.83	0.03	26.82	0.69	Highest
CE6 Teachers design learning activities that allow students to use the community as a learning resource	3.94	0.71	0.77	0.02	32.78	0.60	High
CE7 Teachers conduct learning activities that allow students to practice and apply knowledge within the community	3.94	0.66	0.73	0.02	31.94	0.53	High
Reflective Observation: RO							
RO1 Teachers engage students in discussions to reflect on their learning outcomes from participating in community-based activities	4.09	0.66	0.79	0.02	34.00	0.62	High
RO2 Teachers assign students to record information gathered during community explorations	4.18	0.66	0.86	0.02	39.46	0.74	High
RO3 Teachers facilitate reflective discussions with students to analyze the learning outcomes derived from community-based learning activities	3.97	0.76	0.85	0.02	42.09	0.72	High
RO4 Teachers encourage students to generate questions based on their individual interests related to community learning activities	4.08	0.72	0.78	0.02	39.70	0.60	High
RO5 Teachers have students present their learning outcomes upon completion of the community-based learning activities	4.03	0.68	0.93	0.02	44.70	0.85	High
RO6 Teachers create opportunities for students to exchange ideas and opinions in class regarding the community learning experiences	4.13	0.68	0.82	0.02	37.56	0.66	High
RO7 Teachers encourage students to articulate the value and significance of engaging in community-based learning activities	3.90	0.72	0.88	0.01	47.80	0.76	High
Abstract Conceptualization: AC							
AC1 Teachers design students to present concept maps based on their community learning activities	4.02	0.69	0.89	0.01	46.45	0.78	High
AC2 Teachers guide students to summarize key concepts from organizing learning based on community context management activities to ensure a shared and accurate understanding	4.03	0.64	0.88	0.02	43.70	0.77	High

Table 2 (continued)

Item	M	SD	Std. Factor Loading	SE	t	R^2	Meaning
AC3 Teachers encourage students to organize exhibitions showcasing the knowledge gained from their community studies to promote collaborative learning	4.25	0.56	0.71	0.02	25.29	0.50	Highest
Active Experimentation: AE							
AE1 Teachers assess student learning using a variety of evaluation methods	4.15	0.56	0.80	0.02	31.14	0.64	High
AE2 Teachers integrate knowledge gained from community-based learning into other subject areas	4.11	0.63	0.87	0.02	34.48	0.74	High
AE3 Teachers use experiences from community learning activities to improve the learning curriculum	4.11	0.69	0.90	0.02	41.31	0.80	High
AE4 Teachers consistently implement a curriculum that is grounded in the community context across academic years	4.24	0.55	0.88	0.02	36.27	0.78	Highest
x^2 = 262.80, df= 186, p-value < 0.001; GFI = 0.99; AGFI = 000; SRMR = 0.07; RMSEA = 0.06; *p*-Value for Test of Close Fit = 0.99; NFI = 0.98; IFI= 0.99; CFI= 0.99							

From Table 2, the results of the confirmatory factor analysis (CFA). The analysis indicated that the model demonstrated a very good fit to the empirical data. This conclusion is supported by various model fit indices: x^2 = 262.80, df = 186, p-value < 0.001, x^2 /df = 1.41 (considered good), GFI = 0.99, SRMR = 0.07, RMSEA = 0.06, p-close = 0.99, NFI = 0.98, IFI = 0.99

These values meet the acceptable criteria as proposed by Hu & Bentler (1999) and Hair *et al*. (2010). The standardized factor loadings for all observed variables ranged from 0.71 to 0.93, which exceeds the recommended threshold of 0.50. Furthermore, all factor loadings were statistically significant ($p < 0.05$), indicating that each observed variable significantly represents its corresponding latent construct. The explained variance (R^2) values ranged from 0.50 to 0.85, indicating that the latent variables accounted for a substantial proportion of the variance in the observed indicators. Notably, the highest factor loading within each component was as follows: CE5 Teachers provide opportunities for local experts to participate in the development of the learning curriculum (0.83) in Concrete Experience: CE. RO5 Teachers have students present their learning outcomes upon completion of the community-based learning activities (0.93) in Reflection Observation: RO. AC1 Teachers design students to present concept maps based on their community learning activities (0.89) in Abstract Conceptualization: AC and AE3 Teachers use experiences from community learning activities to improve the learning curriculum (0.90) in Active Experimentation: AE.

Table 3 Fit Indices of the organizing learning based on community context management model

Metric	Value
Root mean square error of approximation (RMSEA)	0.06
RMSEA 90% CI lower bound	0.04
RMSEA 90% CI upper bound	0.08
RMSEA p-value	0.17
Standardized root mean square residual (SRMR)	0.07

Table 3 (continued)

Metric	Value
Hoelter's critical N (α = 0.05)	96.75
Hoelter's critical N (α = 0.01)	103.30
Goodness of fit index (GFI)	0.99
McDonald fit index (MFI)	0.72

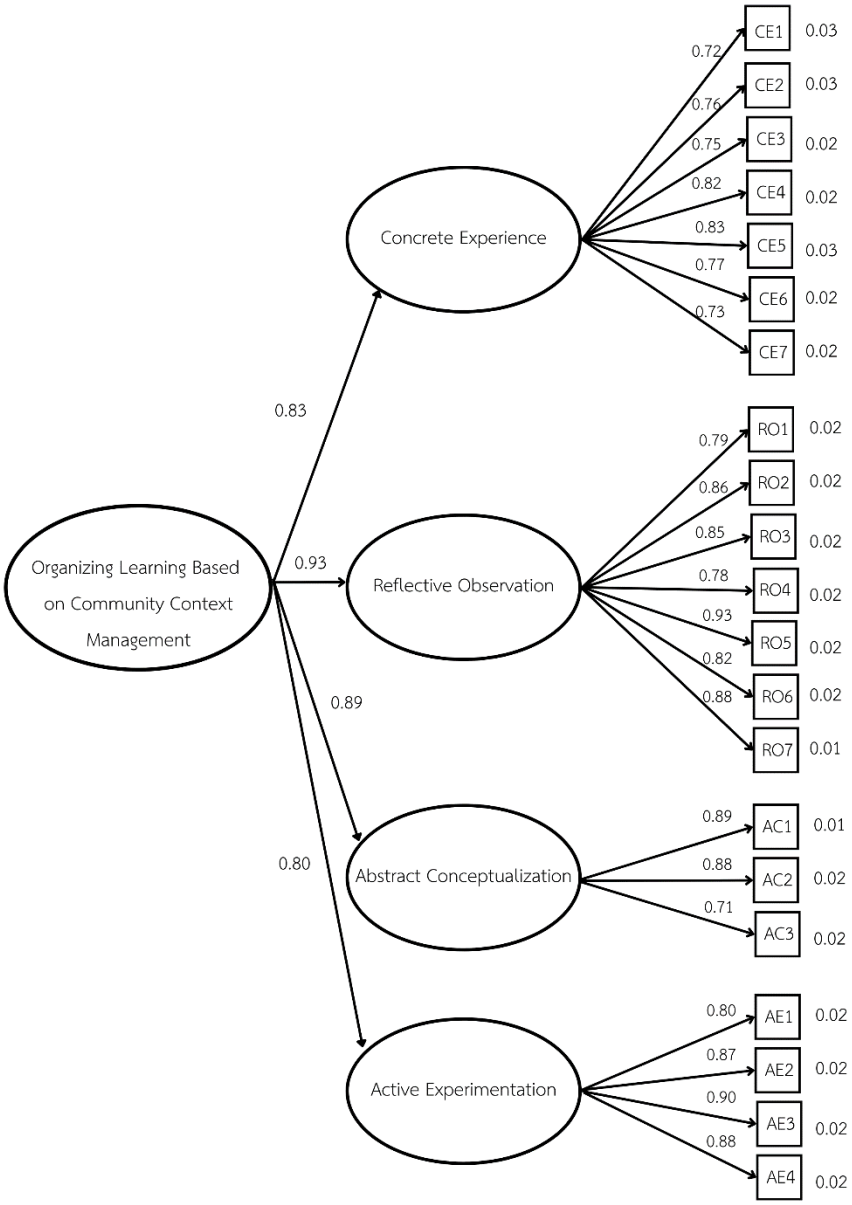

Figure 1 Confirmatory factor analysis model of the organizing learning based on community context management

Discussion

Based on the first objective, to develop indicators for community-contextualized learning management, four indicators were developed with similar weightings in each area, as follows; The significance of the indicators

in each component highlights the processes that teachers should emphasize when implementing community-based learning. Teachers provide opportunities for local experts to participate in the development of the learning curriculum (CE5) is a crucial factor in creating authentic, context-based learning experiences. This aligns with the research by Wargenau & Han (2018), which posits that meaningful community engagement leads to enhanced knowledge acquisition, power-sharing and a collaborative, reciprocal relationship in school development. Teachers have students present their learning outcomes upon completion of the community-based learning activities (RO5), teachers design for students to present concept maps based on their community learning activities (AC1) and teachers use experiences from community learning activities to improve the learning curriculum (AE3) demonstrates the application of knowledge in practice and continuous improvement. In a study by Pascual *et al.* (2021), a model for managing community learning centers was developed. The research found that success is measured by two key indicators: the active participation of community members and increased learning outcomes in terms of knowledge, attitudes and skills. This confirms that direct community involvement significantly impacts academic achievement and these findings are consistent with the Criteria and Methods for Educational Quality Assurance B.E. 2010 (2010), which set forth standards for instructional management that is grounded in community and local contexts (Office of the Education Council, 2014). The availability of clear and practical indicators can assist educational institutions in effectively assessing and developing the quality of learning management in this domain.

Based on the first objective, to examine the goodness-of-fit of the structural equation model of the indicators for organizing learning based on community context management. The findings of this study confirm that organizing learning based on community context can be classified into four main components, as grounded in Kolb's Experiential Learning Theory (adapted from Bedri *et al*, 2017; Kolb & Kolb, 2017) and the concepts of community-context-based learning management (Panich, 2014, as cited in Thongkhao, 2018; Ritthikup, 2018). The strong model fit with the empirical data suggests that the developed indicators can effectively explain the key characteristics of community-based learning management within the context of schools under the Office of Pattani Primary Educational Service Area 1.

However, this study's limitation lies in its relatively low AGFI (Adjusted Goodness of Fit Index) value, which may be attributed to the complexity of the model or the specific characteristics of the sample group. Therefore, future research should examine this model in more diverse contexts and with broader sample groups to confirm the stability and generalizability of the developed model and indicators.

Conclusion and Suggestion

The results of the Confirmatory Factor Analysis (CFA) revealed that the model demonstrated a very good fit with the empirical data. The model comprised four main components and 21 indicators. The overall model fit indices were within acceptable thresholds (χ^2/df = 1.41, GFI = 0.99, SRMR = 0.07, RMSEA = 0.06, CFI = 0.99), supporting the research hypothesis that the confirmatory model of community-context-based learning management aligns well with the empirical data. The research findings provide a clear framework for teachers to develop locally relevant curricula and build collaborative networks with the community. This approach emphasizes providing students with authentic learning experiences through presentations and the synthesis of knowledge, thereby connecting what they learn to real-life applications. Furthermore, the findings are beneficial for school administrators, guiding them in establishing the school as a community hub in line with educational quality assurance standards and building trust with the community.

The following recommendations are presented to guide further research in diverse contexts and with broader samples: to confirm the validity and reliability of the developed indicators, future studies should explore the application of the model in various educational settings (e.g., schools in different geographic or socio-cultural communities) and with more diverse participant groups (e.g., school administrators, students, or parents) and investigate the practical implementation of the indicators: future research should also examine the actual outcomes of applying the developed indicators in educational settings. This may include investigating the impact on student learning quality, teacher and student satisfaction, or the strength of school-community relationships.

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