



# Confirmatory factor analysis of collaboration model in non-formal higher education management in southern Thailand

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## ABSTRACT

This study aims to provide exploratory and confirmatory factor analysis of collaboration model between Local Administrative Organizations (LAOs) and Community Learning Centers (CLCs) in non-formal higher education management in southern Thailand. The study was conducted in eighteen CLCs using questionnaires with participants of 450. Those participants divided into 4 groups: LAOs chiefs, teachers, CLCs committees, and students. The confirmatory factor analysis was run. The findings of the factor analysis showed that the components of collaboration was comprised of four main-factors: (1) the standardization main-factor shows the relationship between the organization's standards, (2) the formalization main-factor refers to the relationship of the organization's formality, (3) the reciprocity main-factor showed the exchange of resources with each other for a good organization's relationship, (4) and the intensity main-factor explains the increase in the intensity of the organization's relationship. Therefore, the collaboration between LAOs and CLCs in non-formal higher education management will improve if the four main-factors have been employed.

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## Introduction

There are several reasons to support the administration decentralization of the local administrative organizations (LAOs) in providing education to the public in each local administrative area. The LAOs have more opportunities to gain easy access to operational level information. In addition, the decision on providing assistance to the public can be made promptly, accurately, and economically. They can also have extended responsibilities of carrying out tasks in relation to the community. The closer relationship to the community, in turn, leads to the motivation to initiate

education that enhances the community's effective learning. Also, the community can designate the size of education that is relevant to their need (Hannaway, 1993; Sayed, 1997; Weiler, 1993). However, nowadays only 428 or five percent, of all the 7,835, local administrative organizations in Thailand offer formal community education (The Quality Learning Foundation, 2012) despite it being an important mission designated by laws (Decentralization Plans and Steps Act, 1999; Municipality Act, 1953; Provincial Administration Act, 1997; Sub-district and Sub-district Administration Councils Act, 1994). In addition, it is explicitly stated in the Structure and Function Theory that the LAOs which control the mechanism of the community must perform the following four responsibilities. The first is adjustment; it is essential that the local administration adjust its system in accordance with the changing situations or contexts. The second is goal achievement; it is requisite that they set major goals and

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make attempt to achieve the major goals. The third is integration; it is essential that the system designate the relationships among several components and manage the relationship with other basic responsibilities. The fourth is maintenance; any local administration organization should have a system that maintains, restores, motivates, constructs, and supports cultural practices in order that each individual can maintain their motivation (Parsons, 1959). It is, therefore, obvious that local administration organizations, as the supervisory bodies of the community system, may not ignore their responsibilities.

At the same time, it is shown in the data base concerning Thai non-formal education that at present there are only 650,000 learners in the education mode, accounting for 30 percent of the overall number of the learners in the basic education of the nation (Office of the Permanent Secretary, Ministry of Education, 2011). When completing grade 12 (or equivalent of high school education) only 10 percent of these learners pursue their higher education in colleges or universities; the rest, or 90 percent, live and earn their living locally in the community. Currently, it is this group who take turns performing as community leaders. The establishment of the Learning Institute for Everyone (LIFE) or the so-called LIFE University which offers tertiary non-formal education, therefore, has become the only alternative for the personal development of this group of people. The LIFE University offer alternative educational programs for youth and people of working age. Their higher education programs and curricula were developed from visualizing the lessons learned by those communities successful in solving the problems happening in their communities. In running the non-formal education by the Community Learning Centers (CLCs), the CLCs operated through the cooperation of the CLCs network spreading all through the nation (Pongpis, 2009). In administration, the CLCs had a memorandum of understanding (MoU) signed by three parties: LIFE, LAOs and CLCs. The CLCs consisted of a representative from three sections, i.e., the representatives of the community, the representatives of the government sector, and the representatives of the LAOs, are responsible for supervising all the activities to be held.

It was found that the actual cooperation between the CLCs and the LAOs is at a limited level despite the fact (Hanghon, 2013), that any cooperation will subsequently be beneficial to all parties as prescribed in the exchange theory stating 'Exchanging occurs through individuals or organizations interactions by considering the rewards or penalty, satisfaction (profit) and dissatisfaction (lost) when performing a task (investment). The relationship will be maintained as far as both parties gain certain profit or consider the exchange to be fair (Blau, 1964).' In other words, the LAOs are equipped with ample budgets and have all the access to the community. However, they are limited to developing educational programs and curricula that receive the approval of and are certified by the Office of the Higher Education Commission (OHEC). The CLCs, on the other hand, have a limited budget and lack easy access to the community. However, if these two organizations can work cooperatively in providing non-formal higher education, satisfaction (profit) will be reached by both parties (win-win). That is to say, the LAO can fulfill the

responsibility mandated by law and the CLCs will have the opportunities to bring the curricula they have heavily invested in and implement it with the communities, leading to the achievement of the goal they have set and with direct benefits to the communities.

'Collaboration' is the behavior of working together of individuals or groups of individuals in establishing an operational network and the setting and prioritizing of goals. These results can be employed to make operational plans and competency evaluation schemes for further improvement. In addition, members have opportunities to do self-evaluation and feel accepted by other parties. These are considered the important characteristics of achievement in cooperation or team work. For the sustainability of the organization, it is necessary that all parties form a team and extend assistance to others in order to reach mutual benefits. It is necessary that all members are aware of their responsibility in searching for means of improving their working performance and relationship (Cramer, 1998; Croewther, 1996; Lucas, 1998; Robbins & Finley, 1998).

The collaboration that can result in better relationship among organizations consists of four dimensions (Marrett, 1971). The first dimension is formalization which consists of agreement formalization and structural formalization. The former means any contact between two parties is formally accepted and approved by law or administrators. The latter means the establishment of an office acting as the mediator for maintaining the relationship between organizations. The second dimension is the increasing intensity of amount of resources involved and the frequency of interactions. The former refers to the size of the resources belonging to the related organizations in making any contact. The latter means the number of contacts between organizations, both formal and informal. The third dimension is reciprocity: resource reciprocity and the definitional reciprocity. The former refers to the flow of the resources between the two organizations that brings benefits to both parties. The latter refers to the contacts that are made according to the mutual agreements. The fourth and final dimension is standardization, consisting of unit standardization and procedural standardization. The former refers to making all the contacting organizations, which are considered as resources, similar to each other. The latter refers to making all the regulations applied in making contacts among organizations similar for a certain period, both the general practice codes and specific ones. The present study, the analysis of the confirmatory factors of collaboration between Local Administrative Organizations (LAOs) and the Community Learning Centers (CLCs) in non-formal higher education management in the Southern Thailand, adhered to the concept proposed by Marrett (1971).

## Methods

### Participants

The collecting and analyzing quantitative data gathered from questionnaires with 450 persons, from 1,940 populations, consists of 4 groups who related to the non-formal higher education management, from 18 CLCs in 5 provinces in southern Thailand: 220 LAO chiefs, 135 teachers, 225 CLC

committees, and 1,360 students. The selection of sample size, used the stratified sampling by proportion of each population group, and then used sampling by non-replace simple random sampling from each population groups; consist of 4 groups with 450 persons: 50 LAO chiefs, 31 teachers, 58 CLC committees, and 311 students. As 90 percent of the excellent sample size is regarded by [Comrey and Lee \(1992\)](#).

#### Data Collection

This study collected and analyzed of quantitative data. The five-point scale questionnaires were used to collect data. These questionnaires were tested for IOC between 0.67 and 1.00, and reliability of Cronbach's alpha was 0.918. The researcher was conducted requested cooperation in data collection and self-collected data from 18 CLCs in 5 southern provinces of Thailand; Chumphon, Suratthani, Krabi, Nakhonsithammarat, and Songkhla.

#### Data Analysis

To answers the objectives of this research, researcher took two steps to analyze the data: is the exploratory factor analysis to select the important variables for the measurement model, and the confirmatory factor analysis to confirm the structure of the measurement model ([Mulaik & Millsap, 2000](#)).

**Step 1 Exploratory factor analysis** determines the number and relationship between components includes the statistics analysis and statistical preliminary agreement, and the exploratory factor analysis (EFA) employ advanced statistical analysis to extract by following four steps. Firstly, the researcher examined preliminary agreement, using of KMO, Bartlett's test of Sphericity Approx, Chi-square to determine the suitability and relevance of the data, secondly, the researcher ran factor extraction by using principal component analysis (PCA) specific, component's Eigen values > 1, thirdly, the researcher employed oblique factor rotation by using Promax method due to four components which are related (not independent), and lastly, the researcher adopted the naming and the weight of the component to define the name of each component and determine the weight indicators, Eigen values, percentage of variance, and cumulative percentage of variance.

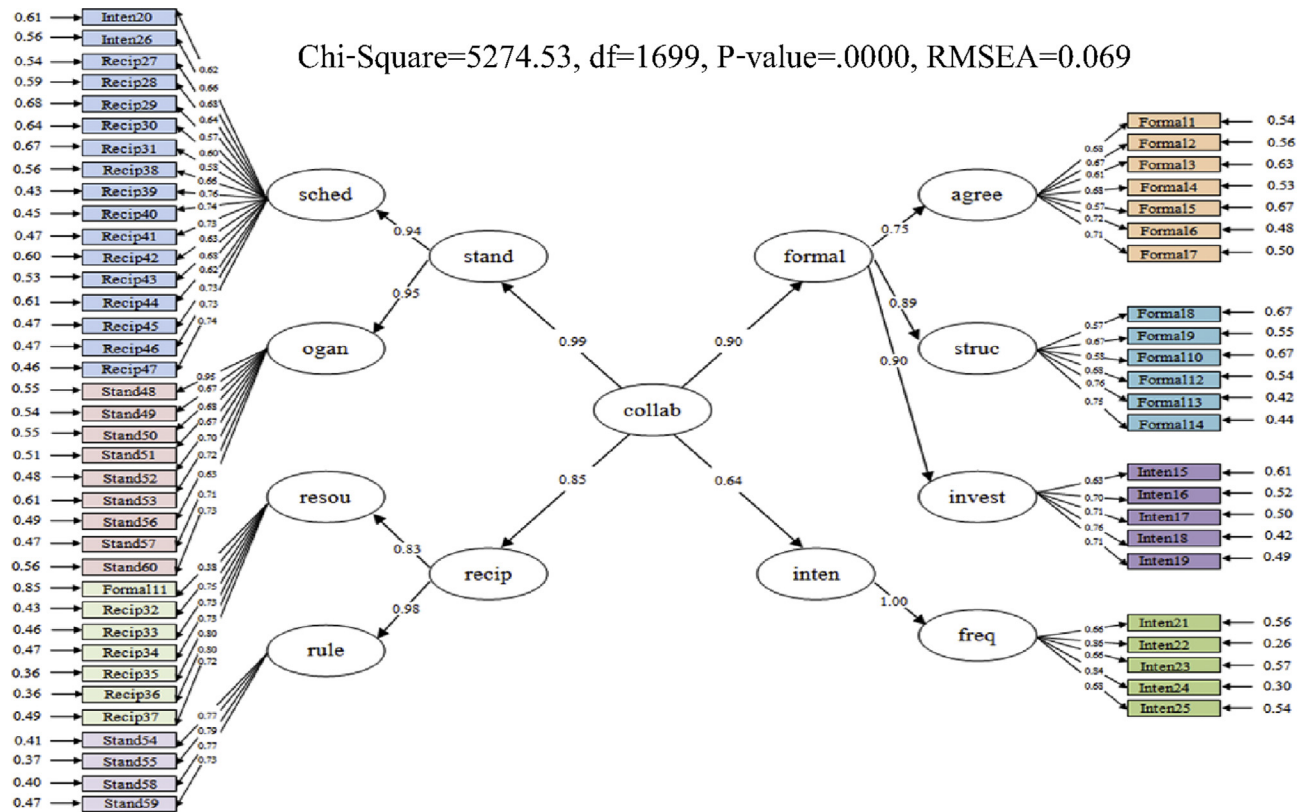
**Step 2 Confirmatory factor analysis** determines the models fitting empirical data with two phases: firstly, the first order confirmatory factor analysis (1st CFA), the researcher used the criterion to examine whether components model is fit for empirical data ([Hair, Black, Babin, Anderson, & Tatham, 2006](#)), chi-square statistics ( $p \leq .05$ ), chi-square relative < 5.00, comparative fit index (CFI)  $\geq 0.95$ , standardized root mean square residual (SRMR)  $\leq 0.08$ , and root mean square error of approximation (RMSEA)  $\leq 0.07$ , and secondly, the researcher employed the third order confirmatory factor analysis (3rd CFA) because the third order confirmatory factor analysis would cover the second order confirmatory factor analysis too, and it is also consistent with the structure of theoretical research.

## Results

### The Results of EFA and CFA

**I. The results of the exploratory factor analysis (EFA)** include: (1) the results of the statistics analysis and statistical preliminary agreement showed that the averages and standard deviations of all 60 indicators to normal distribution, The distribution of the most data is negative skewness and all indicators on the extent distributions are acceptable (+1 to -1). The Kurtosis is lower than the normal distribution of data (below 0), but also in acceptable manner limited (+1 to -1). Therefore, the researcher did not transform any indicators for data analysis. There were 60 indicators of the Pearson correlation coefficient that most of them were positive correlation during .09 to .83 ( $p = .01$  and  $.05$ ), and the 3 lowest pair correlation had correlation coefficient equal .09, (2) and the results of the exploratory factor analysis by advance statistical software, from all 60 indicators showed that KMO = 0.952, Bartlett's test of Sphericity Approx = 1.720 ( $p = .00$ ) indicating that the data is appropriate and can be used to analyze the relationship between elements, **factor extraction** by using principal component analysis (PCA) specific, component's Eigen values > 1 indicated that the suitability components were four components, **factor rotation** used oblique factor rotation by Promax method due to four components are related (not independent), the percentage of variance is between 3.207 and 36.698 and cumulative percentage of variance is 49.635, and the **component names** are the standardization (26 indicators, the weight indicators are between 0.231 and 0.840, Eigen values = 22.019, percentage of variance = 36.698 and cumulative percentage of variance = 36.698), the formalization (18 indicators, the weight indicators are between 0.313 and 0.715, Eigen values = 3.538, percentage of variance = 5.896 and cumulative percentage of variance = 42.594), the reciprocity (11 indicators, the weight indicators are between 0.340 and 0.966, Eigen values = 2.300, percentage of variance = 3.834 and cumulative percentage of variance = 46.428), and the intensity (5 indicators, the weight indicators are between 0.394 and 1.006, Eigen values = 1.924, percentage of variance = 3.207 and cumulative percentage of variance = 49.635).

**II. The results of the confirmatory factor analysis (CFA)** include: (1) the results of the first order confirmatory factor analysis (1st CFA) indicated that the relationship between LAOs and CLCs in non-formal higher education management in southern, Thailand, consists of 4 main components and 8 sub-components; 2 sub-components in **the standardization** (stand) ( $\beta = 0.99$ ), 17 indicators in definitional reciprocity (sched) ( $\beta = 0.94$ ), and 9 indicators in unit standardization (organ) ( $\beta = 0.95$ ); 3 sub-components in **the formalization** (formal) ( $\beta = 0.90$ ), 7 indicators in agreement formalization (agree) ( $\beta = 0.75$ ), 6 indicators in structural formalization (struc) ( $\beta = 0.89$ ), and 5 indicators in amount of resource involved (invest) ( $\beta = 0.90$ ); 2 sub-components in **the reciprocity** (recip) ( $\beta = 0.85$ ), 7 indicators in resource reciprocity (resou) ( $\beta = 0.83$ ), and 4 indicators procedural standardization (rule) ( $\beta = 0.98$ ); and 1 sub-component in **the intensity**



**Figure 1** The collaboration model between LAOs and CLCs in non-formal higher education management in southern Thailand was fitted with the empirical data

(inten) ( $\beta = 0.64$ ): 5 indicators frequency of interaction (freq) ( $\beta = 1.00$ ). The models of 8 sub-component models were fit for the empirical data, above the criterion fit for chi-square relative ( $\chi^2/df$ )  $< 5.00$ , CFI  $\geq 0.95$ , SRMR  $\leq 0.08$ , and RMSEA  $\leq 0.07$  (Hair et al., 2006), (2) and the results of the third order confirmatory factor analysis (3rd CFA) covering the second order confirmatory factor analysis too, found that the collaboration model between LAOs and CLCs in non-formal higher education management in southern Thailand (Figure 1) was fitted with the empirical data and without the modifications (Table 1). When analyzing the validity of the 8 sub-components were showed that the weight of the standard components (W) was on the number of 0.75–0.98, (except, for the frequency of Interaction sub-components (freq), which was the weight of 1.00. It was a special case because of the value close to zero that identifies possible values which will result in the error-free). The weight of raw components (w) were 0.94–3.41, standard error (SE) were 0.05–0.10, *t*-test were 7.41\* – 15.23\*, and the multiple correlation squared ( $R^2$ ) were 0.41–0.98, and the results of the analysis the validity of the 4 main-components indicated that the weight of the standard component (W) were 0.64–0.99, the weight of raw components (w) were 0.24–0.43, standard error (SE) was 0.03, *t*-test were 7.41\* – 13.53\*, and the multiple correlation squared ( $R^2$ ) were 0.41–0.98 (Table 2).

## Discussion and Conclusion

It was found in the present study that the confirmatory factors of collaboration between local administrative organizations (LAOs) and the community learning centers

**Table 1**  
The fit index of models and criteria

Index	Criteria	Statistic values	Result
$\chi^2/df$	$< 5.00$	3.10	Pass
CFI	$\geq 0.95$	0.97	Pass
RMSEA (90% CI)	$\leq 0.07$	0.069 (0.066, 0.071)	Pass
SRMR	$\leq 0.08$	0.069	Pass

**Table 2**  
The validity of models

	Component	Factor loading		SE	t	$R^2$
		W	w			
1	Sched	0.94	0.94	0.07	13.53*	0.87
2	Organ	0.95	0.95	0.06	14.69*	0.89
3	Agree	0.75	1.93	0.06	11.58*	0.45
4	Struc	0.89	2.29	0.07	11.11*	0.64
5	Invest	0.90	2.32	0.07	12.24*	0.66
6	Resou	0.83	2.90	0.10	7.41*	0.49
7	Rule	0.98	3.41	0.05	15.23*	0.98
8	Freq	1.00	1.80	0.06	10.89*	0.41
9	Stand	0.99	0.43	0.03	13.53*	0.98
10	Formal	0.90	0.35	0.03	11.58*	0.81
11	Recip	0.85	0.24	0.03	7.41*	0.72
12	Inten	0.64	0.36	0.03	10.89*	0.41

Note: W = standard factor loading, w = un-standard factor loading, SE = standard error, t = *t*-test,  $R^2$  = multiple correlation squared  
 $p < .05$

(CLCs) in non-formal higher education management in the Southern Thailand consisted of four major factors, eight minor factors, and 60 indicators. The findings supported the concepts proposed by Thai and international scholars (Attamana, 2006; Guetzkow, 1966; Hage & Aiken, 1967; Johns & Demarche, 1957; Levine & White, 1961; Litwak & Hylton, 1962; Marrett, 1971; Mayhew, 1971; Reid, 1964; Whetten, 1982), arguing that the important characteristics that make the collaboration between organizations successful consisted of four dimensions: 1) formalization, consisting of agreement formalization and structural formalization; 2) intensity, consisting of amount of resources involved and frequency of interactions; 3) reciprocity, consisting of resource reciprocity and definitional reciprocity; and 4) standardization, consisting of unit standardization and procedural standardization. It can be confirmed in the present study that any organization cannot exist on its own. Instead, it is essential that organizations operate on the basis of interdependence, which is the foundation of resource exchange for the maximum benefit of the overall organizations.

In analyzing the confirmatory factors it was found that the factors were the same major factors. The disparities found were that certain indicators and certain minor factors were alternatively applied to different major factors, and these indicators and minor factors still have relationship. Therefore, it is shown that the four aforementioned major and eight minor factors played significant roles in creating collaboration between the LAOs and CLCs in non-formal higher education management in Southern Thailand. Lacking any of the factors collaboration can hardly be achieved. Previously the collaboration between the LAOs and the CLCs was at a limited scale in all aspects— academic, budget, personnel and general administration, due to the lack of concrete study on the cooperation factors before the founding of CLCs in the community. The fact that collaboration was sought after the establishment of the CLCs made it difficult to achieve the desired outcomes because both are independent organizations. A longer amount of time is required for building a closer relationship in order to attain a solid interdependence. If dialogue, understanding, and co-studies had taken place prior to founding the CLCs, co-planning for prioritizing collaboration could have been reached. For instance, a formal memorandum of understanding, or MoU, consisting of explicit mutual accepted agreements, should have been made first. That should have been followed by starting the exchange of administration factors, including personnel, budget, supplies, premises, and management experiences or skills. Finally, standardizing and consolidating the collaboration should be gradually increased. If collaboration would have been established from the initial stage of founding, the CLCs should have formed real community learning centers that would have been accepted by both parties. Furthermore, the CLCs would not have been limited to only the management of non-formal higher education. Rather, they would have been expanded to the operation and management of informal education and all other levels of formal education. The subsequent results would have been the overall concrete development of the people in the community, leading to a chain of sustainable community development of different aspects.

## Recommendation

It is recommended in the present study that the four major factors—standardization, formalization, reciprocity, and intensity—be applied in a concrete fashion in order to create and enhance the cooperation between the LAOs and CLCs in the non-formal higher education management in Southern Thailand and other regions having similar contexts. The major factor of standardization, in particular, was found most significant (the standard score = 0.99). The finding corresponded with those found by Thai and international scholars arguing that standardization, which included unit standardization, and procedural standardization, can lead to a steady, continual, and effective operation. It is further recommended in the present study that the cooperation between the LAOs and the CLCs in the non-formal higher education management in Southern Thailand can be achieved through the following three time frames. The first period is the adjustment period during which the major factor indicators (standardization) will be brought into consideration in order to reach a congruent conceptual framework. The conceptual framework, then, is adjusted during the second period, the cooperation period. During this period the indicators in the three major factors (formalization, reciprocity, and intensity) will be employed to create strong cooperation. When activities are repeatedly held in similar or same ways as if they are in the same organization, it is time to proceed to the third period being a part of each other. Formal cooperation is expected to occur during this period; the CLCs are responsible for the development of curricula, learning materials, evaluation schemes as well as instruction management and degree conferring. The LAOs, on the other hand, are obliged to provide budget to cover salary, wages for teachers and staff, and other instructional activity expenses.

## Conflict of Interest

None.

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