Full Length Research Paper

Latent profile analysis of the good teacher characteristics in the 21st Century in the Northeastern Region of Thailand

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This research aimed to analyze the Latent Group Profile, hereafter (LPA) of good teacher characteristics' in the 21st century in the Northeastern region of Thailand. The samples were 4 groups, viz; 10 expert teachers for interviewing on the draft of the variable to develop the indicators; 12 teachers who won Guru Awards from Teachers Council for in-depth interviewing and use the data to adjust the variable to confirm good teacher characteristics' in the 21st century in a real situation. 1,103 primary school teachers in the Northeastern region were random from 11 provinces and were selected by applying multi-stage sampling technique and employed them for second-order confirmatory factor analysis. The research instrument was a set of 71 items questionnaire focusing on the good teacher characteristics' in the 21st century. The reliability of the questionnaire was at 0.933 and the discrepancy was between 0.264 - 0.696. The research findings revealed that, the LPA had 3 models, and the numbers of the groups in each model were 2, 3 and 4, respectively. When considering the probability that the classification was the most accurate (E_k), it was the model with 2 groups (likelihood = -7138.381, AIC = 14344.763, BIC = 14514.960, ABIC = 14406.967, E_k = 0.954). The proportion of the teachers in the LPA group 1 were 483 teachers, who were being a good role model for the learners (43.79%) and the LPA group 2 were 620 teachers, who believed in good values (56.21%).

Key words: Latent profile analysis, indicators, exploratory analysis, confirmatory factor analysis, the good teacher characteristics' in the 21st century.

INTRODUCTION

The goal of educational management is to develop learners, not just only educating learners, but also developing the learners' knowledge, thinking, work skills, ethics, social and mental capacity-solving complex problems (Sayamkammajon Foundation, 2016). The most important persons in the process of education are the teachers, whom Thai society has long regarded as venerable persons for ages. But it is because of societal progress that politics, economy, and technological development have changed rapidly under the globalization. Western cultures have flown into the Thai society, and have affected the teachers' characteristics,

and influenced the current society. These changes have caused a direct impact on the way of life in both positive and negative aspects of the teachers' characteristics that cannot be ignored or avoided. The teachers' life goals have changed; they now focus on the objects, their honor, their stability and all of these have caused the teachers a lot of debt (Wichit, 1999, cited in Kurutham, 1985). Therefore the teacher characteristics have reduced gradually, implying that the teachers in the 21st century have to adjust themselves to the knowledge society or learning society. The educational organizations need to adapt themselves to be a learning organization.

Teachers are the most important factors in the educational process and policy that develop teachers' efficacy lead to developed students' outcome. Although Thailand has the standard for the teaching profession and there are many studies and definite various meanings of good teacher characteristics', there were no studies on developing the indicators of good teacher characteristics in the 21st century or what the character of the present teachers are and do as they conform to the change of the 21st century. Based on the importance of changing teachers' characteristics to be the outstanding teachers in the 21st century, the researcher is interested in studying what the good teacher characteristics in the 21st century of the teachers in the Northeastern region of Thailand are. This study is based on the indicators of the good teacher characteristics' in the 21st century. The characteristic of the indicators used to classify them are continuous observed variables. The researcher found out that the analytical technique that corresponds to this research problem is the Latent Profile Analysis (LPA) which is a new technique for finding and categorizing many continuous observed variables into small groups. The LPA provides accurate classification and it allows both dimension and similarly characteristics within the group, differences between groups, or specific group characteristics together with the characteristics of each group at once (Mutually Exclusive and Exhaustive) (Bray et al., 2006).

The results from the analysis will help to obtain useful information clearly and when the researcher wants to study the problem without the supporting of hypothesis with a theoretical framework. It will help the related persons to get the data of what level the good teacher characteristics' in the 21st century are. It also characterized the teachers in the Northeastern region of Thailand and how much it differs and to what extent. The results will help them know and plan to develop the good teacher characteristics' in the 21st century according to the characteristic of teachers in each group.

Indicators of the good teacher characteristics' in the 21st century

The indicators in this research were developed by the researcher and employed mixing methodology in sequential equivalent design. The researcher conducted the qualitative research method first, and then followed by a quantitative research method. The method of the development composed of 4 phases, viz; Phase 1: to create the good teacher characteristics' in the 21st century; Phase 2: to develop and adapt the indicators of the good teacher characteristics' in the 21st century; Phase 3: to apply an exploratory factor analysis; and Phase 4: to check the consistency between the 21st century model of the good teacher characteristics' indicators and the empirical data. The development of the indicators and questionnaires were composed of 11 standards and 71 indicators. There were: Standard 1 - report on the learners' development and developing learning materials systematically with 11 indicators; Standard 2 - collaborate with others in the community creatively with 7 indicators; Standard **3** - develop a practical lesson plans with 8 indicators; Standard **4** - perform activities concerning the high potential of learners with 8 indicators; Standard **5** - be a good role model for the learners with 7 indicators; Standard 6 - perform regular academic activities for teachers' professional development with 8 indicators; Standard **7** - seek and use information in professional development with 6 indicators; Standard **8** - believe in good values with 4 indicators; Standard **9** - perform the activities concerning the benefits of the learners with 5 indicators; Standard 10 - to organize learning activities focusing on learners' development with 4 indicators; Standard 11 - self-development on teacher profession with 3 indicators.

Research objective

This research aims to analyze group profiles of good teacher characteristics' in the 21st century in the Northeastern region of Thailand.

RESEARCH METHODOLOGY

Population and sample

The population in this research was the teachers' from Primary Educational Service Area in the Northeastern region of Thailand and the samples were 1,103 teachers from 11 provinces Primary Schools which were selected by applying multi-stage sampling technique (Table 1).

Research instrument

The research instrument was a set of 5-rating scale questionnaire focusing on the good teacher characteristics in the 21st century. The questions are based on 11 standards and 71 indicators

5 = the opinion on what the good teacher in the 21st century should have at the highest level.
4 = the opinion on what the good teacher in the 21st century should have at a high level.
3 = the opinion on what the good teacher in the 21st century should

Table 1. Number of samples.

S/N	Provinces	Number of samples (person)	%
1	Maha Sarakham	94	8.5
2	Nakhon Ratchasima	98	8.9
3	Kalasin	106	9.6
4	Yasothon	99	9.0
5	Khon Kaen	151	13.7
6	Amnat Charoen	95	8.6
7	Ubonratchathani	95	8.6
8	Si Sa Ket	106	9.6
9	Nong Khai	89	8.1
10	Nong Bua Lam Phu	100	9.1
11	Chaiyaphum	70	6.3
Total		1,103	100

have at a medium level.

2 = the opinion on what the good teacher in the 21st century should have at a low level.

1 = the opinion on what the good teacher in the 21st century should have at the lowest level.

The instrument was developed in the following stages:

1) The researcher employed the exploratory factor analysis, and got 12 standards and 72 indicators with Eigen value and variance percentage as shown: Standards 1 and 2 (6.637 and 9.218), Standard 3 (5.479 and 8.028), Standard 4 (4.921 and 6.835), Standard 5 (4.874 and 6.769), Standard 6 (4.499 and 6.248), Standard 7 (4.050 and 5.625), Standard 8 (3.633 and 5.046), Standard 9 (3.631 and 5.043), Standard 10 (3.130 and 4.347), Standard 11 (2.170 and 3.014). All 11 standards can explain the variance of co-characteristic at 69.502%.

2) The researcher found out the discrepancy by employing item total correlation of the score in each item and total score of the rest questions with the Pearson Product Moment Correlation Formula and found that the discrimination was between 0.389 - 0.768.

3) The researcher originated the reliability of the whole instrument using Alpha Coefficient of Cronbach, which was at 0.979.

4) Analysis of the construct validity of the questionnaires used the confirmatory factor analysis χ^2 = 1817.237, *df* = 1809, p-value = 0.4412, CFI = 1.000, TLI = 1.000, RMSEA = 0.002, SRMR = 0.021 and χ^2/df = 1.004.

Approach

This research was the LPA of the good teacher characteristics' in the 21st century in the Northeastern region of Thailand. The characteristic of the observed variables were the continuous variables and latent variables were the categorical variable. The researcher conducted the research by using M-plus Version 7.2 with 5 phases as follows: (Webel, 1996; Muthen and Muthen, 2009). The samples were 4 groups; 10 expert teachers for interviewing on the draft of the variable to develop the indicators; 12 teachers who won Guru Awards from Teachers Council for in-depth interviewing and use the data to adjust the variable to confirm good teacher characteristics' in the 21st century in a real situation. 1,103 primary school teachers in the Northeastern region were random from 11 provinces, were selected by applying multi-stage sampling

technique and employed for second-order confirmatory factor analysis

Phase 1: Develop the indicators of good teacher characteristics' in the 21st century

Step 1: The researcher created a draft of the variables by reviewing the texts, documents, theories, researches and interviewing 10 expert teachers' opinion about the draft and then used inductive analysis.

Step 2: the researcher develop the variables and adjust the variables in step 1 by in-depth interviewing 12 teachers who won Guru Awards from Teachers Council, then used inductive analysis in order to develop the variables to conform the real situation.

Step 3: the researcher did the second development of the variables by employing exploratory factor analysis.

Step 4: the researcher examined the consistency of the good teacher characteristics' model with the empirical data by using second order confirmatory factor analysis.

Phase 2: Analyze the LPA of good teacher characteristics' in the 21st century of the teacher under Primary Educational Service Area in the Northeastern region of Thailand.

Step 1: The researcher developed a model for analyzing latent structures with the LPA based on the good teacher characteristics' in the 21st century. It had 11 standards and 71 indicators.

Step 2: The researcher set the detail and re-checked the data.

Step 3: The researcher estimated the parameters of the model, and defined the number of profile group as 2, 3, 4,...., k which the program would analyze it based on the numbers of profile groups as the following steps:

3.1: Analyze the goodness of fit test of the LPA with the empirical data.

3.2: Estimate the probability of each observed variable in the sample and what it should be in each group.

3.3: Examine the pattern of variables or behaviors of samples in each cluster with the consistency of the probability in each pattern.

3.4: Find mean probability of class memberships.

3.5: Evaluate group differences and the number of the samples.

Table 2. Result of the LPA of the good teacher characteristics' in the 21st century of the teachers in the northeastern region of Thailand.

Number of groups	Log likelihood	Number of free parameter	AIC	BIC	ABIC		Members in each class
2	-7138.381	34	14344.763	14514.960	14406.967	0.954	1 = 483 2 = 620
3	-6402.028	46	12896.057	13126.323	12980.216	0.921	1 = 160 2 = 455 3 = 488
4	-5907.099	58	11930.197	12220.533	12036.311	0.909	1 = 91 2 = 332 3 = 351 4 = 329

ABIC= sample-size adjust BIC, E_k= Entropy.

Table 3. The result of the coefficient of the LPA of the good teacher characteristics' in the 21st century in the northeastern region of Thailand.

Standard	Class 1			Class 2		
	Mean	S.E.	%	Mean	S.E.	%
1. Report on the learners' development and develop learning materials systematically.	3.829**	0.022	76.58	4.574**	0.018	91.48
2. Collaborate with others in the community creatively.	3.944**	0.025	78.88	4.595**	0.019	91.9
3. Develop a practical lesson plan.	3.842**	0.022	76.84	4.662**	0.017	93.24
4. Perform the activities concerning the high potential of the learners.	3.912**	0.022	78.24	4.713**	0.016	94.26
5. Be the good role model for the learners.	4.172**	0.029	83.44	4.867**	0.011	97.34
6. Perform regular academic activities on teacher professional development.	3.898**	0.021	77.96	4.709**	0.016	94.18
7. Seek and use information in professional development.	3.856**	0.022	77.12	4.624**	0.020	92.48
8. Believe in good values.	4.139**	0.030	82.78	4.883**	0.011	97.66
9. Perform the activities concerning the benefit of the learners.	3.959**	0.025	79.18	4.741**	0.016	94.82
10. To organize learning activities focusing on student development.	3.873**	0.023	77.46	4.659**	0.020	93.18
11. Self-development on teacher profession.	3.798**	0.028	75.96	4.541**	0.024	90.82
Count		483			620	
Proportions		0.43790			0.56210	
Proportions mean		0.985			0.989	

Step 4: Compare the analysis from Step 3 regarding which model was the most appropriate and what the numbers of that group are by considering the goodness of fit test of the LPA model from the index AIC, BIC and ABIC. That was, if these statistics were small or close to zero, they represent the most appropriate model.

Step 5: Present the results of the analysis and interpretation.

RESEARCH SUMMARY

The result of the LPA of the good teacher characteristics' in the 21st century of the teachers in the Northeastern region of Thailand showed that it was because the analytical indicators were the continuous variables and the latent variables were the categorical variables; thus, the researcher studied the variables according to the indicators in Phase 1. The result revealed that 11 standards and 71 indicators of the good teacher characteristics' in the 21st century of the teachers in the northeast were used to categorize the teachers according to those standards, and indicators. The estimate of parameter of the LPA was shown in Tables 2 and 3.

From Table 2, the result of the LPA revealed that there were 3 models of the good teacher characteristics' in the

21st century of the teachers in the Northeastern region of Thailand. The numbers of the groups in each model were 2, 3 and 4 groups respectively. When considering the probability of the most accurate classification (E_k), it was the model with 2 groups (likelihood = -7138.381, AIC = 14344.763, BIC = 14514.960, ABIC = 14406.967, E_k = 0.954).

From Table 3, it was found that the proportion of the students in LPA group 1, were 483 students and calculated at 43.79%. LPA group 2 had 620 students and calculated at 56.21%. There was the significant difference level in each variable in groups 1 and 2 at 0.01 levels. This has shown that all of the standards could be used to represent the characteristic of the good teachers' in the 21st century in every group.

In the LPA group 1, when the mean of each variable was compared with the mean score probability of the group (0.985), it could classify the LPA depending on the indicators in one group. It was the group with significance lower than the mean score in every indicator. Standard 5, being a good role model for learners was at the highest mean score (4.172**) and the most significant indicator to be chosen into group 1 is called the group of the good role model teacher.

In LPA group 2, when the mean score of each variable was compared with the mean score of the probability of the group (0.989), it could classify the LPA depending on the indicator in one group. It was the group with significance lower than the mean score in every indicator. Standard 8, believing in good values, was the highest mean score (4.883**); and the most significant indicator of the member to be chosen into group 2 is called the group of the good values.

Considering the mean score of all indicators in two LPA groups, it was found that the LPA group 2 was significantly higher than those in the LPA group 1 in all indicators (The LPA group 1 had the mean score range from 75.96 to 83.44%, whereas LPA group 2 had the mean score range from 90.82 to 97.66%). It meant all standards could be used to classify the teachers based on the good teacher characteristics' in the 21st century. The LPA group 1 was the group of 483 teachers who serve as the good role model for the learners and the LPA group 2 was the group of 620 of the teachers who believed in the good values. This is shown in Figure 1.

DISCUSSION

Results of the LPA of the good teacher characteristics' in the 21st century of the teachers in the Northeastern region of Thailand according to the standards and indicators revealed that the teachers could be divided into two groups: the group of the 483 teachers who have been the good role model for the learners with the mean range from 75.96 to 83.44% and the group of 620 teachers who believe in the good value with the mean

range from 90.82 to 97.66%. Both two groups had a little bit of mean differences and the mean was at the high level, which meant that most teachers in the Northeast of Thailand had the characteristics of good teachers. The result consisted with the study of Suneeporn Ratkarnwiwat (2006) who studied on the level of being a good teacher according to the teacher's handbook on "A good teacher who develops national human resources of the government teachers at schools that offered first and second intervals under the Office of Maha Sarakam Educational Service Area Office 2. The study indicated that the level of the self-performance of being a good teacher, according to the teacher's handbook was at the high level in all aspects: ideal and spirituality of being a teacher; the life-long self-development in terms of morality, ethics, moral principles, academics and teaching profession. Self-behaving and self-performance to be a good model in duty performance and living one's life to deserve being the person of worship for the social and attention to perform complete duties of the teacher by using dharma principles and academic principles.

When considering the standards and indicators used in the classification, it was found that all of them could identify the characteristic of the good teachers' in the 21st century of the teachers in the northeastern region of Thailand. The accuracy of forecasting was at 95.40% (E_k = 0.954), which may be because the LPA was a statistical method used to find and categorize the members into sub-groups from using the observed variables as many continuous variables and of using latent variables as classified variables. It was consistent with the variables that the researcher studied. The variables are derived from the development of researcher's indicators using the mixed methodology. The research was developed into three phases: Phase 1 - creating the standards and indicators of the good teacher characteristics' in the 21st century; Phase 2 - developing the standards and indicators; and Phase 3 - checking the consistence between the measurement models of standards and indicators hypothesis with the empirical data. It affected the grouping profiles with high predictive capabilities and it made both dimension of the number and the characteristic of the contributors within the group or the difference between the groups or specific characteristic of the groups including the characteristic of each group thoroughly in at once (mutually exclusive and exhaustive). The results of this research stated that most teachers in the northeastern region are the teachers, who are being a good role model for their learners and believing in good values. The classification of such groups has never been studied in classification criteria. It was impossible to know in advance how the distribution results in the number of subgroups (Bray et al., 2006, cited in a speech by Soonthonpot et al., 2012) and it was corresponding to Pastor et al. (2007) who studied on the LPA of concentrating the learning achievement goal and found
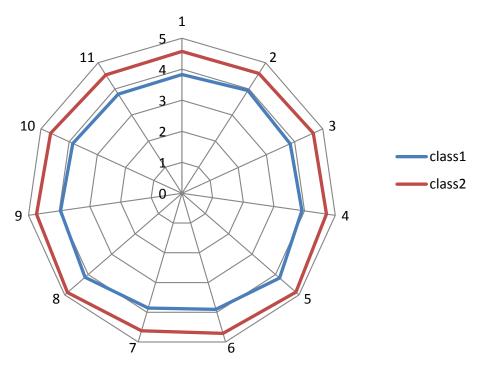
Figure 1. The LPA of the good teacher characteristics' in the 21st century in the northeastern region of Thailand.

that the LPA gave the better analysis than traditional techniques (such as regression and cluster analysis) and also with Bulotsky-Shearer et al. (2012) who studied on the LPA of the learning behaviors by peers and teachers. It was found that the LPA could clearly categorize the learning behavioral problems into two groups namely; a group of the learners with a high learning behaviors and a group of learners with low learning behaviors. Also, it was consistent with Sunan and Boonchoom (2015) who studied on the LPA of good citizenship of the students of Rajabhat University in the northeastern region; the results revealed that there were 3 models of the LPA according to the indicators that the researcher studied. The numbers of the groups in each model were 2, 3 and 4 respectively. When considering the probability of the most accuracy, it was the model of two groups' member (likelihood = -1840.622, AIC = 3731.244, BIC = 3848.359, ABIC = 3768.970, E_k = 0.922). The proportion of students in the LPA group 1 was 258 and calculated at 32.20% and the LPA group 2 was 542 students and calculated at 67.70. Overall, all 8 indicators were significantly different at the level of 0.01 within the LPA group 1 and the LPA group 2. It meant that all the indicators could represent all good citizenship in each LPA group.

As well as the tools used in this research, the researcher developed in accordance with academic principles and the samples were the teachers from 11 provinces from the northeast of Thailand which were sufficiently large to affect the reliability of the research

result. The results of this research were consistent with the good teacher characteristics' in accordance with 12 standards of professional teacher of Teachers' Council (Secretariat Office of the Teachers' Council, 2006) and the good teacher characteristics according to Dharmic principle, the royal initiate of King Rama IX, the National Education Act, the judgment of the people, the project of promoting good teachers, and good teachers according to the concept of foreign educators (Leawwarin, 2013).

The LPA group 1 was a group of 483 teachers who have being good role models for the learners with the mean of 75.96 to 83.44%. They were a total of 4 indicators; 1) gentle, 2) self-discipline, 3) economy, loyalty, patience, harmony, punctuality, morals, ethics, justice, appropriate manner, emotional stability, and 4) clean and tidy outfit appropriate to the place and time. These were the most important indicators of the members being classified into the LPA group 1. And it conformed to the 8th standard of the Teacher Council which served as good role model for the learners; good expression, behavior and general personality, dressing, manner and ethically appropriate to be the teacher earning the learners admiration and consideration as a model (Office of the Secretary, Teachers Council, 2006). Also, it was consistent with the good teacher characteristics according to Dharmic principle (Leawwarin, 2013; cited in Dictionary of Buddhism-Pramuandhammas, 2011) which stated that the person who was a morale teacher, well-behaved, good role model and made the learners wanted to follow their

teachers with the encouragement to do well. It consisted with the royal speech of King Rama IX gave to the senior teachers in 1979 said that ".... true teachers must be diligent and persevering, generous and self-sacrificing, tolerant, patience, disciplined, careful in performance to be a good role model, integrity, faithfulness, sincerity, compassion, had a good will, be neutral not prejudice, increasing intelligence on both academics and reasons...". And this agrees with Sumon Amornwiwat who said that the teacher should be a good role model (Ubon Leawwarin, 2013).

The LPA group 2 were 620 teachers who had the good teacher characteristics' in the 21st century in term of believing in good values at the mean of 90.82 to 97.66% with a total of 4 indicators which was diligence, behaving in accordance with the professional ethics, kindness and high responsibility assisted with the 8th standard of Teachers Council in aspect of being the good role model for the learners (Office of the Secretary, Teachers Council, 2006). The result along with the royal speech of King Rama IX on the graduation ceremony of the university students and college education students at 13th December 1962 "...the duty of the teachers and lecturers was to teach the students to gain valuable knowledge and to train their mind to have good morality and be good citizens of the nation. Teachers' work was a very important job, as it is expected that they behave as good teachers to earn the students' respect and the parents' trust..." and the royal speech of King Rama IX given to the senior teachers at Dusidalai Hall on October 28th, 1980. "...A real teacher was the person who always does good things, for example, diligent, industrious, generous including selfless, discipline, good behavior, ambitious, honest, sincerity, kind, well-disposed, neutral mind, train the learner to be smart, in other words, to act as a teacher was to create the true virtue and to cultivate virtue or increase goodness. It would nourish the soul to grow stronger and refined to be purely clean ... " (Ubon Leawwarin, 2013); it agrees with the good teacher characteristics' under National Education Act, Section 53 which stated that teachers must behave in a moral and ethical manner in teacher profession.

Conclusion

The findings in this research can be beneficial for teachers, learners, parents, school administrators, and educators.

(1) Teachers get information to develop themselves to be good teacher characteristics' in the 21st century, plan their teaching-learning process aimed at enabling the learners to develop themselves at their own pace and to the best of their potential.
(2) The learners are enabled to have a better The learners are enabled to have a better understanding

and awareness of the importance of good teacher qualities in the 21st century. The leaners understand and develop themselves to be good teachers and their career in the future that correspond to the changing world.
(3) The parents whose children have learned to be professional teachers understand good teacher characteristics' in the 21st century and cooperate with the educational institutions to organize experience to help encourage their children to be good teachers in the 21st century.
(4) The school administrators have information to policy setting, plan for the academic activities, budget support to promote the teachers to be good teacher characteristics' in the 21st century.
(5) The educators get the indicators of good teacher characteristics' in the 21st century of the teachers in the Northeastern region of Thailand, and are able to create the activities to promote the teacher good characteristics through various activities.

Suggestions for the future research

(1) The LPA in this research found that all standards and indicators could clearly categorize the teachers who had the good characteristics in the 21st century into two groups. Therefore, researchers or educators can use the process of the LPA as a guide to analyze latent characteristic of the variables in case there is no clear group classification before. The character of the observed variables must be the continuous variables.
(2) This LPA had the fifth standard, which was a good role model for the learners, and constituted the most important indicator of the members being classified in the LPA group 1 and the 8th standard; being a good role model were the most indicators of the members being classified into the LPA group 2, both two standards had exactly the same mean, so the researcher could adopt one of these standards as a criterion to classify the teachers.
(3) The study of the LPA of the good teacher characteristics' in the 21st century was conducted by analyzing the opinion of the teachers. The results reflected that the good teachers should believe in good values and be a good role model for the learners. The next study should be conducted about the identification of the good teacher characteristics' in the 21st century on the students' opinions.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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