Learning Leadership of School Administrators and Teaching Behavior Affecting The Effectiveness of Teacher Professional Development: Hierarchical Linear Model

Julasak COCKPIM
Jul_kumath_kku@hotmail.com

Kanokorn SOMPRACH
Corresponding Author, Faculty of Education, Khon Kaen University, Thailand
kanoklin@kku.ac.th

ABSTRACT
The main aim of this research was to investigate the effects of learning leadership of school administrators and teachers' teaching behavior toward teacher professional development. A total of 412 samples consisting of 103 school administrators and 309 teachers participated as respondents. Researchers utilized a quantitative survey design with a questionnaire instrument. Descriptive statistics were used to examine the perceived level of all variables and inferential statistics, applying hierarchical linear model using teacher and school administrator level. Results showed that all the independent variables either school administrators' learning leadership or teachers' teaching behaviors are positively associated to teacher professional development at significant level 0.01. Teachers' teaching behavior was correlatively explained to the variance of teacher professional development of 20.60 percent. The learning leadership factors namely creativity and integration and advanced technologies were significantly affecting teacher professional development at 0.01 and 0.05 levels respectively. Finally, learning leadership was correlatively explained 95.50 percent to the variance of teacher professional development and learning leadership factors namely creativity and team learning were significantly affecting teachers' teaching behavior at significant level of 0.01 and 0.05 respectively.

KEYWORDS: Learning leadership; teacher professional development; teachers' teaching behavior

INTRODUCTION

According to Kouzes and Posner (2016), learning leadership is so influential of direction and outcomes whether at the micro level of schools and learning environments, or of extensive systems. Somprach and Tang (2016) defined learning leadership is a leadership style that engaging in the design, implementation, and sustainability of powerful innovative learning environments. A teacher professional development can be described as a collegial group of teachers and principals who work and learn together in their commitment to enhance learner achievement (Leclear, 2015).

Somprach, Tang, and Popoonsak (2017) explored the role of essential leadership styles of school principals in encouraging teachers' participation in professional learning community to 731 teachers in basic education in northeastern of Thailand. Their findings indicated that learning, transformational, collaborative, and invitational leadership styles are the four significant predictors for promoting teachers' participation in professional learning community. In addition, Thailand Manual for Strategic Plan, Ministry of Education (2010) emphasized that Thailand needs to have comprehensive guidelines to develop teachers' professional skills to prepare its future global citizens of the 21st century.

Somprach, Prasertcharoensuk, and Tang (2016) surveyed 375 teachers regarding the relationship and effect of administrative factors that affecting the effectiveness of Thai World Class Standards Schools. Their findings indicated that the four significant predictors are factors for using information and communication technology, teacher professional development, internal process management and the focus on learners and stakeholder that have successfully contributed 65.60 percent variance of effectiveness of Thai World Class Standard Schools at 0.01 significance level with multiple correlation coefficient as 0.81.

RESEARCH OBJECTIVES

Based on the previous literatures above, researchers would like to investigate learning leadership of the school administrators, teachers' teaching behavior toward teacher professional development in schools under the administration of the Office of Secondary Education Region 22, Thailand. The following are the specific objectives of this study:

i. To identify the perceived level of learning leadership of school administrators, teachers' teaching behavior and teacher professional development.

ii. To examine the fixed and random effects of null model.
iii. To examine the fixed and random effects of simple model.
iv. To examine the fixed and random effects of hypothesis model.

METHOD

Survey design was employed using questionnaire as a method to collect quantitative data. A total of population 2,843 consisted of 137 school at macro level and 2,706 teachers at micro level from 137 schools under the Office of Secondary Education Region 22, Thailand. A total of 103 schools were selected out of 137 schools in accordance with the Krejcie and Morgan's Table (1970). A multistage sampling technique followed by proportional simple random sampling technique was administered to select samples according to the two levels. Therefore, the target groups were divided into two levels, namely school administrator level and teacher level with a ratio one school administrator to three teachers. Consequently, the sample size of 103 school administrators was randomly selected in proportion to different sizes of schools namely small, medium, and large. This is followed by simple randomized teacher-level samples under the sample of 103 school administrators at macro level. As a result, the total samples of teacher were comprised of 309 teachers at micro level. Since researchers employed Hierarchical Linear Modeling (HLM), a large sample size is needed in order to find accurate group variation. Hair, Back, Babin and Anderson's (2013) proposed that the proper ratio of samples is 20:1 or 20 samples per one observable variable. Since there were 11 observable variables in this study, the required sample size was 220 samples of teachers. On this line of reasoning, simple random sampling technique was utilized to select 309 of teachers to fulfill Hair et al. (2013) suggestion that sample size should not less than 100.

Two types of survey questionnaire were used in this study catering for macro and micro levels respectively. The two types of questionnaire were administered in the Thai language to ensure that the respondents could understand about the statements. This survey questionnaire method benefits this study in terms of obtaining data more efficiently as time, energy, and costs would be minimized (Wyse, 2012), hence provides an excellent means of measuring attitudes and orientation in a large population which can, therefore, be generalized to a larger population (Gay, Mills, & Arirasian, 2012).

Teachers' teaching behavior was the micro level independent variable consisted of six factors namely learning management plan, learner centered teaching activities, use of media and technology, assessing the actual condition, classroom management, and classroom action research. On the other hand, learning leadership of school administrators was the macro level independent variable was comprised of creativity, powerful learning environment, flexibility, integration, advanced technologies, team learning, and school-directed learning. Dependent variable was teacher professional development included professional learning community, specific curricula, student-learning needs, quality teaching, and enterprising collaboration.

RESULTS OF THE STUDY

Results of this study are presented based on the research objectives that are indicated above. The initial result is the descriptive results related to the three variables namely teachers' teaching behaviors, learning leadership of school administrator, and teacher professional development. This is followed by results from HML analysis for null hypothesis testing.

Descriptive results of all the perceived level of learning leadership of school administrators, teachers' teaching behavior and teacher professional development.

Descriptive results indicated that all the variables of this study are perceived at high levels. Specifically, the perceived level of learning leadership of school administrators, teachers' teaching behavior, and teacher professional development were found at high level as their mean score was 4.43, 4.26, and 4.27 respectively. Table 1 shows the average score of the perceived level of each variable.

Table 1: Results of the perceived level of practice on each variable

Variable	Mean score	*SD*	Interpretation
Learning leadership	**4.43**	**0.32**	**high**
Creativity	4.46	0.43	high
Powerful learning environment	4.43	0.37	high
Flexibility	4.44	0.51	high
Integration	4.41	0.44	high
Advanced technologies	4.43	0.36	high
Team learning	4.45	0.38	high
Self-directed learning	4.43	0.41	high

Teachers' teaching behavior	**4.26**	**0.49**	**high**
Learning management plan	4.32	0.50	high
Learner centered teaching activities	4.25	0.54	high
Use of media and technology	4.24	0.55	high
Assessing the actual condition	4.22	0.63	high
Classroom management	4.32	0.57	high
Classroom action research	4.18	0.64	high
Teacher professional development	**4.27**	**0.46**	**high**
Professional learning community	4.21	0.56	high
Specific curricula	4.27	0.59	high
Student-learning needs	4.27	0.61	high
Quality teaching	4.34	0.50	high
Enterprising collaboration	4.35	0.49	high

Null model analysis

The micro-level analysis of HML was conducted in two steps. The first step (null model) was conducted on the dependent variables without considering any independent variables. As indicated in Table 2, the results of fixed effect test showed that the total mean score of teacher professional development was 4.251 (γ_{00} = 4.251) with a statistical significance at 0.01. Therefore, researchers were able to use the simple model analysis for the second step (simple model).

Table 2: Results of null model from fixed effect and random effect

Fixed effect	**β**	**Standard Error**	**t-test**	**df**	**p-values**
INTRCPT, γ_{00}	4.251**	0.040	107.351	102	<0.001
Random effect		**Variance**	**df**	**χ^2**	**p-values**
Mean difference of school (U_{0j})		0.132	102	559.695	<0.001

**p<0.001

Simple model analysis

Based on Table 3, the results of fixed effect test showed that the total mean of the teacher professional development was 4.245 (γ_{00} = 4.245) with a statistical significance at 0.01, t = 216.284. Independent variables at micro-level that provided positive effects on teacher professional development were learning management plan and learner centered teaching activities with every factor variable having a statistical significance of 0.01. The regression coefficient of each factor was 0.317 and 0.355 respectively. Both of the factors were used to explain the variance of teacher professional development of 20.60 percent. This implies that the promotion of learning management plan and learner centered teaching activities can improve teacher professional development. Analysis of random effect was illustrated through the following equation:

Teacher professional development = 4.245** + 0.317** (learning management plan) + 0.355 ** (learner centered teaching activities)

Table 3: Results of simple model from fixed effect and random effect

Fixed effect	**β**	**Standard Error**	**t-test**	**df**	**p-values**
INTRCPT, γ_{00}	4.245**	0.020	216.284	102	<0.001
LMP	0.317**	0.065	4.864	102	<0.001
LCTA	0.355**	0.049	7.275	102	<0.001
Random effect		**Variance**	**df**	**χ^2**	**p-values**
TPD		0.009	85	133.650	0.001
LMP		0.151	85	119.945	0.008
LCTA		0.021	85	122.510	0.005
Mean difference between teachers		0.071			

**p<0.01

Hypothetical model analysis

Factors of learning leadership of school administrators that were positively affecting teacher professional development namely flexibility, integration, and advanced technologies. The regression coefficient of each factor was 0.169, 0.129, and 0.083 respectively, with statistical significance 0.01 and 0.05. The analysis result was illustrated through the following equation.

Teacher professional development = 4.238** + 0.169** (Flexibility) + 0.129* (Integration) + 0.083* (Advanced technologies)

These factors were used to explain the variance of teacher professional development of 31.21 percent. This implies that the learning leadership of school administrators were affecting learning management plan were creativity and team learning factors. Both factors have influence over regression coefficient at 0.370 at significant level of 0.05. The analysis result was illustrated through the following equation:
Learning management plan = 0.283** + 0.370**(Creativity) + 0.335* (Team learning)

The factors at the level of school administrators can be explained by the variance of learning management plan of 11.18 percent. The factors at the level of learning leadership of school administrators affecting activities that learner centered teaching activities were creativity, integration, and advanced technologies which having influence over regression coefficient at 0.425 and 0.284 significantly at 0.01 and at 0.443 significantly at 0.05 as illustrated through the following equation:
Leaner centered teaching activities = 0.333** + 0.425** (Creativity) + 0.284** (Integration) + 0.443* (Advanced technologies)
The variables at the level of school administrators can be explained by the variance of learner centered teaching activities of 14.39 percent. The administrator-level model can be explained the variance of teacher professional development of 95.50 percent.

Table 4: Results of hypothesis model analysis from fixed effects and random effects

Fixed effects	β	Standard error	t	df	p
TMD	4.238**	0.019	223.998	95	0.000
Flexibility	0.169**	0.062	2.727	95	0.000
Integration	0.129*	0.058	2.233	95	0.028
Advanced technologies	0.083*	0.037	2.223	95	0.029
LMP	0.283**	0.062	4.541	95	0.000
Creativity	0.370**	0.132	2.805	95	0.000
Team learning	0.335*	0.144	2.324	95	0.017
LCTA	0.333**	0.048	6.959	95	0.000
Creativity	0.425**	0.158	2.686	95	0.009
Integration	0.284**	0.099	2.879	95	0.000
Advanced technologies	0.443*	0.208	2.135	95	0.035

Random effects	Variance	df	χ^2	p
TMD	0.006	78	123.643**	0.001
LMP	0.134	78	105.331*	0.021
LCTA	0.018	78	104.39985*	0.024
Difference between teachers	0.063			

DISCUSSION AND CONCLUSION

Results of this study revealed that predictors of teachers' teaching behavior that affecting teacher professional development were learning management plan and learner centered teaching activities. This implies that teachers' teaching behavior is important because it can directly affect teacher professional development. The results are found to be in line with Buntos's (2014) and Somprach et al.'s (2017) studies. Buntos's study revealed that there are three predictors for teacher professional development namely self-awareness, broad vision, and teaching skills with a multiple-correlation coefficient of 0.727, predictor coefficient or predictive power of 52.80 percent significantly at 0.05 level. Somprach et al. demonstrated that the greater the flexibility of the hiearchy through learning leadership, the higher the teachers' participation levels in professional learning communities.

The learning management plan and learner centered teaching activities were positively affected teacher professional development. This implies that the learning management plan allows teachers to be prepared to face problems and prepare classroom activities to suit the lessons and learners. On the other hand, learner centered teaching activities also contributed to teacher professional development because the changes in current education requires more dynamic educational management according to the principle that all learners are able to learn and develop themselves. In addition, results revealed that learning leadership factors namely flexibility, integration, and advanced technologies are important to promote teacher professional development. Therefore, all the educational agencies should encourage teachers to participate in teacher development planning, monitor the evaluation of supervision, follow up the work, prepare themselves to handle a variety of learning styles, and provide adequate budget and training needs.

Results showed that creativity and team learning are significantly affected the learning management plan. This implies the importance of learning leadership in fostering the learning skills of 21st century learners through the design and development of innovative learning environment to meet the needs of learners. Besides, results also found that creativity, integration, and advanced technologies are the most influential independent variables toward learner centered teaching activities. Teachers are encouraged to play a role in implementing the curriculum. They have to manage class to achieve the objectives of the curriculum in order to raise the quality of education to become realistic. They should also integrate between sciences and cross-sciences to promote and develop the learners to be able to associate knowledge appropriately, leading to potential and intelligence. The aim is to provide the learners with the opportunity to search for information and select useful information, learn how to work with others happily. In addition, the school administrators should encourage teachers and school personnel to utilize appropriate technologies to improve the quality of teaching and learning in accordance with the curriculum standards and facilitate and support a variety of technologies to lead to further learning innovations.

Results of this study contribute to the growing interest in incorporating teachers' teaching behavior coupled with school administrator's learning leadership to improve teacher professional development into accountability of educational policy will be informed according to these results of the study. Similar to previous studies, researchers include school fixed effects in all of the three models, which helps to reduce this and other potential sources of bias. However, as a result, our estimates are restricted to within-school comparisons of teachers and school administrators and cannot be applied to inform the type of across-school comparisons that district typically seek to make.

Researchers believe that HLM is an important statistical tool to investigate the relationship between learning leadership of school administrators, teachers' teaching behavior, and teacher professional development. By taking into account the hierarchical nature of educational data, HLM separates variation in teachers' teaching behavior into between teachers and between learning leadership of school administrators and then analysis each factor in relation to the other. Hence HLM offer better statistical adjutments and more accurate estimations and promote better educational policies and practices.

Finally, researchers would like to suggest to the Office of Educational Service Area should focus on the development of learning leadership of school administrators by organizing seminars and study tours to provide educational administrators with opportunities to develop themselves. Participatory action research is recommended by using the results of this research as a guideline for teacher professional development.

ACKNOWLEDGEMENTS

The researchers would like to thank Faculty of Education, Khon Kaen University for providing the financial supports to conduct this research. Special thanks to Khon Kaen University for its technical and research support to make the research a success. Researchers would like to take this opportunity to thank all the contributors who had involved and helped until completion of this research operation.

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