

Causal relationship in classroom research skills among teachers in the deep South of Thailand

Affi Lateh^{1*}, Sathaphorn Ruengrung², Attapon Liwan³

^{1,3}Faculty of Education, Prince of Songkla University, Thailand; affi.l@psu.ac.th (A.L.).

²Na Chaluai School, Ubon Ratchathani-Amnat Charoen Secondary Education Service Area Office, Thailand.

Abstract: Developing classroom research skills requires knowledge, ability, and practice. Understanding the factors that influence these skills is important. This study aimed to investigate the causal relationship among classroom research skills of teachers in the Deep South of Thailand. The sample included 239 teachers from three southern border areas who completed an online questionnaire comprising four parts: general information, self-assessment of classroom research skills, true-false questions to evaluate classroom research knowledge, and a 5-point Likert scale assessing factors influencing classroom research skills, including curriculum and training quality, attitude, motivation, administrative support, and the impact of workload and unrest. The structural equation model hypothesis was tested using PLS-SEM, and results showed that six hypotheses were statistically significant. Curriculum and training quality, as well as academic standing, had a positive influence on classroom research skills. Curriculum and training quality had a positive influence on attitude and knowledge. Administrative support had a positive influence on motivation, while the impact of workload and unrest had a negative effect. These results reflect the importance of quality curriculum and training to build teachers' confidence in conducting research systematically. Although the study found that the impact of workload and unrest did not have a direct effect on classroom research skills, it is possible that teachers in the area were already familiar with the challenges they face and able to perform their duties, including conducting research, while managing these challenges.

Keywords: Classroom research skills, Deep South of Thailand, PLS-SEM, Teacher development, Unrest impact.

1. Introduction

Classroom research is a spiraling process that follows the operational research ladder, as proposed by Kemmis and McTaggart [1] consisting of four main steps: planning, action, observation, and reflection. Freeman [2] proposed a six-stage cycle for classroom research, including creating doubts about classroom operations, establishing questions, collecting data, analyzing data, interpreting the acquired information, and publicizing the findings. Starting with problem analysis, teachers should define methods for solving problems, develop innovative approaches by applying relevant theories and literature, and create new teaching methods or ways to adapt new behaviors to solve classroom problems. The procedures for implementing the method or innovation should be specified for who, when, and how to use, along with collecting information on the results. This information can be gathered through records, interviews, tests, or questionnaires, leading to conclusions and reflections [3].

Many academics have endeavored to implement teaching processes or methods that empower students or teachers to conduct research or classroom research successfully. For instance, Lateh [4] and Waree [5] utilized research-based learning to help undergraduate students develop research skills. Additionally, Buakaew [6] used coaching in conjunction with research-based learning to enhance

research skills for undergraduate students, while Rungroungvanichgul [7] proposed a Smart Training Model to enhance the research competence of teacher-researchers. Suksomboon, et al. [8] used the TNet CAR researcher network model, whereas Meesuk, et al. [9] used classroom research-based instruction to increase teachers' knowledge, understanding, and skills in conducting research in the classroom. Finally, Lateh, et al. [10] presented the Kalyanamitr PLC model to enhance the research potential of tertiary educators in the classroom. Meanwhile, the actions may only yield results for conducting classroom research at the time, and some individuals may find it difficult to complete. This may be attributed to other factors such as attitudes towards classroom research [11-13] teacher workload [14-16] the promotion of research, policies and support or an emphasis on classroom research [15, 17, 18] research knowledge and ability in the classroom [16, 19, 20] motivation [18, 20, 21] experience participating in research activities, operational experience in educational institutions, availability of materials, and access to academic resources [14, 19, 22, 23].

The provinces of Pattani, Narathiwat, and Yala in southern Thailand continue to experience unrest, leading to significant economic, social, and educational challenges. Research conducted by Thongmark, et al. [24] reveals that the cultural identity of the people, including language, religion, history, culture, and ethnicity, is closely linked to local educational factors. Khampol [25] emphasizes the critical role of two factors in education management success in the southern border provinces: the quality of administrators and the level of dedication among teachers. Furthermore, Pongpajon [26] highlights issues such as budget and resource constraints, diversity awareness, language barriers, environmental concerns, curriculum problems, and difficulties in learning management. To address these challenges, Nantachaipan, et al. [27] suggested developing a comprehensive peace education curriculum, implementing community-based education programs, and providing psychosocial support services for students and teachers affected by the conflict. Therefore, it is essential for relevant agencies to prioritize the promotion of classroom research skills among teachers in southern Thailand to achieve successful learning management solutions.

2. Objective

To explore the causal relationship in classroom research skills among teachers in deep south of Thailand

3. Hypothesis

Based on relevant theories and research, this study's conceptual framework and its independent and dependent variables are as follows (Figure 1):

- H₁: Curriculum and training quality has a positive influence on attitude*
- H₂: Curriculum and training quality has a positive influence on knowledge*
- H₃: Curriculum and training quality has a positive influence on classroom research skills*
- H₄: Attitude has a positive influence on knowledge*
- H₅: Attitude has a positive influence on classroom research skills*
- H₆: Knowledge has a positive influence on classroom research skills*
- H₇: Administrative support has a positive influence on classroom research skills*
- H₈: Administrative support has a positive influence on motivation*
- H₉: Motivation has a positive influence on classroom research skills*
- H₁₀: Administrative support has a positive influence on workload and unrest impact*
- H₁₁: Workload and unrest impact has a positive influence on classroom research skills*
- H₁₂: Academic standing has a positive influence on classroom research skills*

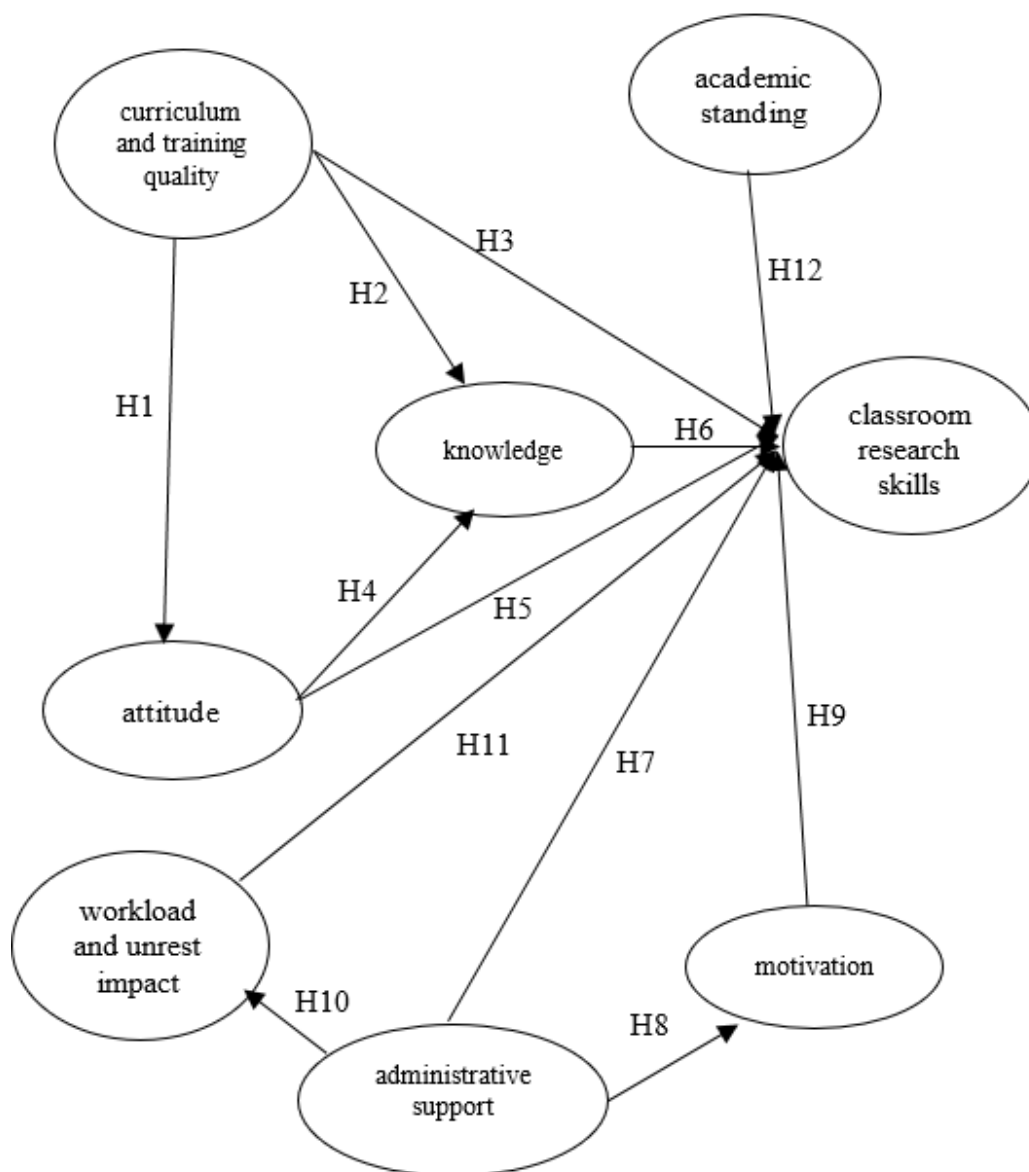


Figure 1.
Conceptual research framework.

4. Methods

4.1. Population and Sample

The population of this study comprises approximately 3,000 teachers from office of the basic education commission in deep south of Thailand. Convenience sampling was employed in conjunction with an online questionnaire to select potential participants. The sample size was calculated based on G*Power program with F statistics of multiple regression analysis including nine variables (seven latent variables and two observe variables of formative model) at the .15 effect size and .05 significance level with 95% power of the test. Additionally, the rule of thumb suggested by Hair, et al. [28] was used, which recommended a sample size of 10 times the number of observe variables. Consequently, 240 participants were deemed to be the ideal number. However, 239 complete returned responses were obtained.

4.2. Instrument

The online questionnaire divides into four parts: Part I contained the demographic information including sex, age, academic standing and province. Part II consisted of ten rating scores related to self-assessment of classroom research skills, which include 15 response item about research proposal writing and research report writing. Part III was a 12-item true-false test that measures classroom research knowledge. Part IV was the 5-point Likert scale estimator questionnaire contains 22 response items, in five factors, including curriculum and training quality, attitude, motivation, administrative support, and workload and unrest area. The five rating scores refer to agreement levels, including strongly agree, agree, unsure, disagree, and strongly disagree. The items also yield the I-CVI of 1, passing a pilot phase with 30 non-participant respondents. The knowledge test's difficulty ranges from .34-.78, and discrimination range from .26-.80, the questionnaires' alpha coefficients of each factor were .82, .78, .80, .84, and .95.

4.3 Data Analysis

The test and the questionnaire were analyzed using descriptive statistics in percentage, mean, and standard deviation and subsequently interpreted following the criteria of 4.51-5.00 (strongly agree) 3.51-4.50 (agree) 2.51-3.50 (unsure) 1.51-2.50 (disagree) 1.00-1.50 (strongly disagree). Also, factors affecting classroom research skills were analyzed in Cronbach's alpha coefficients, convergent validity, discriminant validity, factor loading, effect size, coefficient of determination, and goodness of fit (GOF). The hypothesis was tested in the context of PLS-SEM with bootstrapping, a nonparametric method with resampling techniques commonly used for exploratory research objectives to ensure convergence in the case of small sample size or where a formative model is employed [29]. The analysis was conducted using SmartPLS 3.0, where the dependent variables were part of a formative model. In this model, the formative indicators were created from all observed variables and were composed of their respective latent variables. This means that all two elements in classroom research skills cannot be eliminated, and if any element is missing, the results would not reflect the definition of classroom research skills. In other words, the formative model was required, or the latent variables were composed of the measures. In terms of independent variables, the reflective model contained some or all reflective indicators of the observable variables to form a latent. In other words, measures were representative of the variables, which are called reflective indicators [30].

5. Results and Discussion

Out of the total participants, 51 were males (21.28%) and 188 were females (78.72%). Among them, 60 were under the age of 30 (18.24%), 134 were between the ages of 30-40 (40.73%), and 135 were over the age of 41 (41.03%). Additionally, 254 of the participants held a professional level academic standing or lower (77.20%), while 75 held a senior professional level academic standing (22.80%). Geographically, 232 participants resided in Pattani province (70.52%), 51 in Yala province (15.50%), and 46 in Narathiwat province (13.98%).

The response item for assessing classroom research skills was based on a ten-point rating scale for self-assessment. The results showed that the participants had an average score of 6.67 for research proposal writing (S1) and 6.50 for research report writing (S2). Regarding classroom research knowledge assessed through true-false items, the participants achieved an average score of 3.97 out of 5 for the development of research proposals (K1) and 4.36 out of 5 for analyzing, drawing conclusions, and discussing the results (K2).

Upon analyzing the responses to the items in part IV's five factors, the results revealed that the factor "curriculum and training quality" had the highest mean score for Q3: "Learning management design for research courses or receiving training that enables them to carry out classroom research on their own" with a mean of $M=4.05$ ($SD=.79$), followed by Q2: "Classroom research instructor or receiving training contributes to seeing the research process that can be carried out systematically" with a mean of $M=4.05$ ($SD=.81$). In terms of attitudes towards classroom research, the highest mean score

was observed for A2: "Classroom research results can be put to good use" with a mean of $M=4.38$ ($SD=.71$), followed by A1: "Classroom research can improve learning management" with a mean of $M=4.36$ ($SD=.72$). Regarding motivation, both M3: "Research has led to the discovery of new learning management techniques" and M4: "Research is done to improve teaching and learning" had the highest mean score with $M=4.29$ ($SD=.77$). With regards to administrative support, the highest mean score was observed for S2: "The opportunity for teachers to receive training makes classroom research more systematic" with a mean of $M=4.17$ ($SD=.86$), followed by S3: "Encouraging talks from administrators enable classroom research to continue" with a mean of $M=4.10$ ($SD=.88$). Finally, for workload and unrest impact, W2: "Schools should allocate time to teachers for classroom research" had the highest mean score with $M=3.78$ ($SD=1.03$), while W6: "Unrest in the area caused teachers to weaken morale in preparation for teaching and conducting research in class" had a lower mean score of $M=3.18$ ($SD=1.17$), as highlighted in Table 1.

Table 1.
Means and standard deviations of the response items within the five factors

Item	Statement	Mean	SD	Interpretation
Q1	Research subjects in the university curriculum or receiving training to understand the process of conducting research in the classroom as well.	3.96	.88	Agree
Q2	Classroom research instructor or receiving training contributes to seeing the research process that can be carried out systematically.	4.05	.81	Agree
Q3	Learning management design for research courses or receiving training that enables them to carry out classroom research on their own.	4.05	.79	Agree
A1	Classroom research can improve learning management.	4.36	.72	Agree
A2	Classroom research results can be put to good use.	4.38	.71	Agree
A3	Research helps change teachers' learning management behavior for the better.	4.28	.74	Agree
A4	Classroom research instills pride and faith in the profession of a teacher.	3.03	1.15	Unsure
M1	Research is the responsibility of the teacher.	4.01	.93	Agree
M2	Conducting research enhances teachers' academic knowledge.	4.21	.84	Agree
M3	Research has led to the discovery of new learning management techniques.	4.29	.77	Agree
M4	Research is done to improve teaching and learning.	4.29	.77	Agree
M5	Classroom research makes it possible to solve various problems its happening in class.	4.19	.81	Agree
M6	Conducting research in class is considered a merit.	2.92	1.31	Unsure
S1	Receiving financial support from educational institutions will enable classroom research to achieve the goals set.	3.78	1.03	Agree
S2	The opportunity for teachers to receive training makes classroom research more systematic.	4.17	.86	Agree
S3	Encouraging talks from administrators enable classroom research to continue.	4.10	.88	Agree
W1	Doing research in the classroom increases the workload for teachers.	2.98	1.17	Unsure
W2	Schools should allocate time to teachers for classroom research.	3.78	1.03	Agree
W3	Doing research in class wastes time in teaching.	2.60	1.16	Unsure
W4	Unrest in the area prevents teachers from conducting research in the classroom to meet their goals.	2.97	1.21	Unsure
W5	Solving the problem of low student achievement prevents teachers from fully conducting classroom research.	3.09	1.20	Unsure
W6	Unrest in the area caused teachers to weaken morale in preparation for teaching and conducting research in class.	3.18	1.17	Unsure

The internal consistency reliability of the items based on the independent variables within the reflective model produced Cronbach's alpha coefficients in the range of .800-.898, which were acceptable since they were greater than .80 according to Hair, et al. [31]. This means that the response items of each factor were internally consistent and were adequate to jointly explain that factor. Furthermore, since the average variance extracted values (AVE) were in the range of .594-.830, they were acceptable for exceeding .50 according to Ramayah, et al. [32]. In terms of discriminant validity, according to the Fornell-Larcker criteria, the values within the diagonal line were in the range of .810-.908, which were

greater than those outside the diagonal line of the matrix that was from .189 to .804. Furthermore, the Heterotrait-Monotrait (HTMT) values were in the range of .151-.865, which were acceptable since they were lower than .90 according to Ramayah, et al. [32]. The data indicated that the response items of the measurement model could adequately measure specific factors within its model. In terms of multicollinearity, SEM analysis suggested that the observed variables in the reflective and formative models produced VIF values in the range of 1.000-4.559, which were acceptable since they were lower than 5 according to Hair, et al. [31]. The figures showed no multicollinearity was identified across the seven factors. The measurement model revealed that “research report writing” yielded the highest main loading (.899), followed by “research proposal writing” (.107), the response items from knowledge had the factor loading from .611-.849. Furthermore, the response items from the curriculum and training quality factor produced factor loadings from .902-.919, whereas attitude had the factor loadings from .666-.890, motivation from .812-.895, administrative support from .755-.905, workload and unrest impact from .687-.859, and academic standing had the factor loading of .156. Consequently, M6, W2, and W6 was eliminated for producing a factor loading that is lower than .600. However, the research classroom skill and knowledge component were not removed from its model regardless of its factor loading because the model was formative (Figure 2).

The SEM results were found to support the five research hypotheses at the R^2 of .183. Hence, the seven factors could explain classroom research skills at 18.3%. Furthermore, since GoF was .360, the model was highly suitable according to Wetzels, et al. [33]. In general, the results confirmed that six of the hypotheses were valid (Table 2). Details are further discussed below.

H₁: Curriculum and training quality has a positive influence on attitude with $t = 10.592$ p -value = .000

H₂: Curriculum and training quality has a positive influence on knowledge with $t = 2.154$ p -value = .016

H₃: Curriculum and training quality has a positive influence on classroom research skills with $t = 5.008$ p -value = .000

H₄: Administrative support has a positive influence on motivation with $t = 13.878$ p -value = .000

H₅: Administrative support has a positive influence on workload and unrest impact with $t = 2.084$ p -value = .019

H₆: Academic standing has a positive influence on classroom research skills with $t = 3.028$ p -value = .001

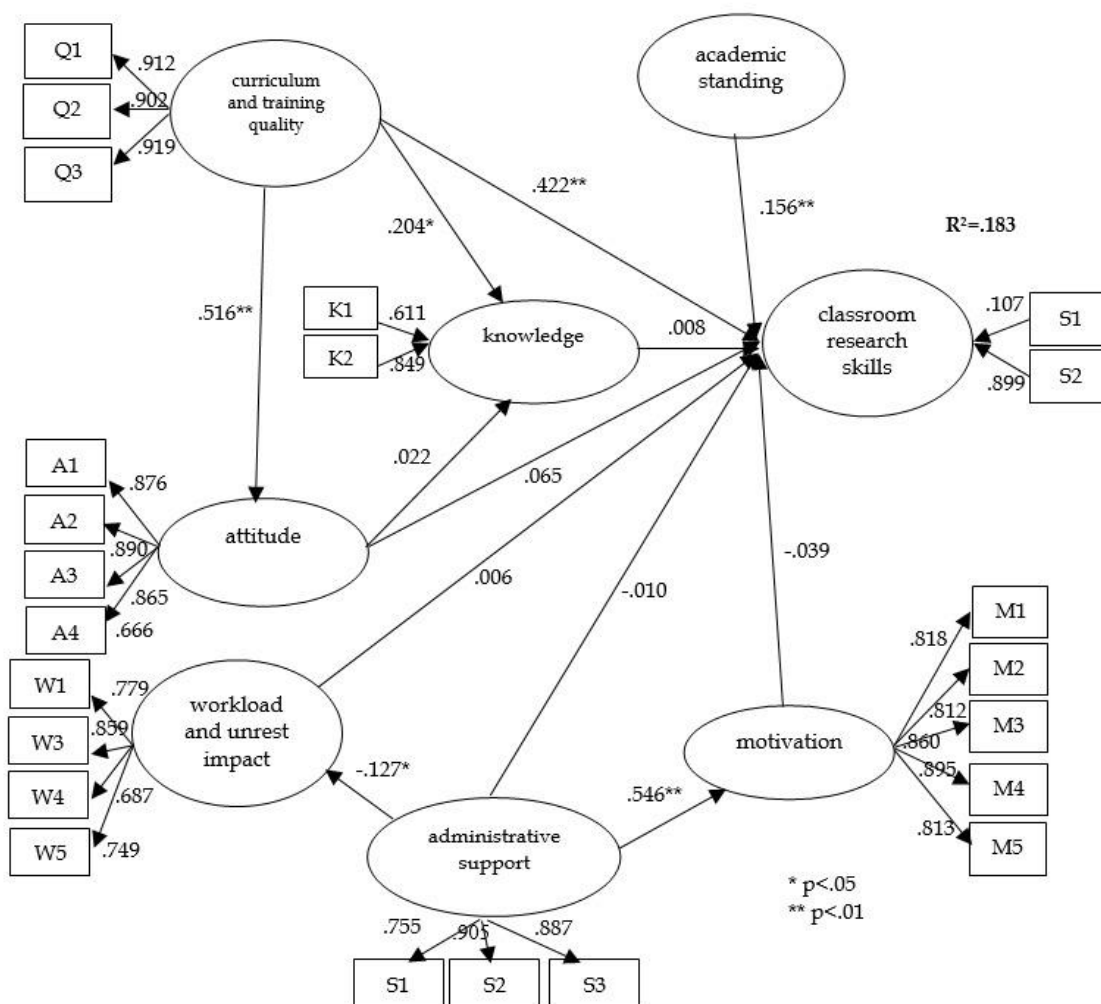


Figure 2.
PLS-Path analysis of classroom research skills.

According to the Importance-performance Matrix Analysis, the curriculum and training quality is the most important factor for classroom research skills, with a score of .457. This is followed by academic standing and attitudes towards classroom research, with scores of .156 and .065, respectively. On the other hand, classroom research motivation received the highest performance score, with a value of 80.232 out of a total score of 100. The next highest performance scores were for classroom research attitudes, administrative support, and the curriculum and training quality, with efficiency levels of 77.273, 76.684, and 72.806, respectively. The results are presented in Table 3 and Figure 3.

The results of the hypothesis test using the structural equation model indicate that there were two factors, namely curriculum and training quality, and academic standing, that positively influenced classroom research skills at a statistical significance level of .01. The study suggests that teachers under the Basic Education Commission in the deep south provinces need to acquire research proposal writing skills and the ability to write a classroom research report by completing a research course in the university or receiving training on the research process. These findings are consistent with previous studies by Weerawan, et al. [34]; Kultanan, et al. [35]; Rungroungvanichgul [7]; Sritawan, et al. [36]; Kyaw [23] and Lateh, et al. [10] which developed training models to develop the potential of doing

research in the classroom. Another significant factor that positively influenced classroom research skills was academic standing. Teachers with higher academic standing need to create and develop innovative learning management strategies to solve problems, develop students, and write research reports to apply for academic standing according to the guidelines set by the Committee on Government Teachers and Educational Personnel of Thailand. These findings are consistent with Phusawat and Meejang [19] found that researcher qualifications were among the top three factors affecting classroom research, and Boonmuang [20] also found that position and academic standing were significant factors affecting the classroom research of secondary school teachers.

Table 2.
Significance of direct effects- Path coefficient (n=239).

H	Path	Beta value	SE	t-value	p-value	Result
1	curriculum and training quality -> attitude	0.516	0.049	10.592	0.000**	Supported
2	curriculum and training quality -> knowledge	0.204	0.109	2.154	0.016*	Supported
3	curriculum and training quality -> classroom research skills	0.422	0.084	5.008	0.000**	Supported
4	attitude -> knowledge	0.022	0.103	0.219	0.413	Not Supported
5	attitude -> classroom research skills	0.065	0.090	0.719	0.236	Not Supported
6	knowledge -> classroom research skills	0.008	0.059	0.127	0.449	Not Supported
7	administrative support -> classroom research skills	-0.100	0.068	1.469	0.071	Not Supported
8	administrative support -> motivation	0.546	0.039	13.878	0.000**	Supported
9	motivation -> classroom research skills	-0.039	0.098	0.400	0.345	Not Supported
10	administrative support -> workload and unrest impact	-0.127	0.061	2.084	0.019*	Supported
11	workload and unrest impact -> classroom research skills	0.006	0.081	0.076	0.470	Not Supported
12	academic standing -> classroom research skills	0.156	0.052	3.028	0.001**	Supported

Note: *p<.05 **p<.01, SE: Standard Error.

Table 3.
Importance-performance Matrix Analysis

	Classroom research skills	
	Important	Performance
Knowledge	0.008	64.337
Curriculum and training quality	0.457	72.806
Attitude	0.065	77.273
Motivation	-0.139	80.232
Administrative support	-0.122	76.684
Workload and unrest impact	0.006	47.050
Academic standing	0.156	22.796

Figure 3 The level of importance and level of performance of latent variables. The study demonstrated that curriculum and training quality had a significant positive impact on classroom research knowledge and attitudes with a statistical significance. Teachers who underwent quality training developed the necessary skills to create classroom research proposals, analyze and summarize results, and confidently discuss research findings, which improved their learning management behavior and instilled pride and faith in their profession. Such knowledge, belief, and confidence arise from self-improvement through quality courses and training. These findings align with Weerawan, et al. [34] which highlighted the importance of continuous supervision, administrator cooperation, and teacher

involvement in problem-solving related to learning management in developing teachers' knowledge, skills, and positive attitudes. Linsri and Sanrattana [37] and Sritawan, et al. [36] studies found that teachers satisfied with their training curriculum for enhancing classroom research competency had a better understanding of how to apply their newfound knowledge appropriately in their role as teachers. This indicates that teachers' knowledge and understanding are useful and can be applied effectively in their teaching practices.

The study found that administrative support had a significant positive impact on classroom research motivation at the .01 level. This indicated that when teachers in the deep south provinces received training opportunities, financial support from educational institutions, and encouragement from their management, they were more likely to conduct research in the classroom continuously, systematically, and achieve their goals. This is consistent with the findings of Jiraro [38] and Mesupthong [39] which highlight that teachers and administrators who encourage teachers to use their knowledge and experience fully, provide opportunities for creativity, follow-up, and praise can motivate teachers to work, ultimately affecting the quality of students. Similarly, Suriyon, et al. [40] found that school administrators who encourage teachers to attend training seminars, listen to opinions, and support opportunities for classroom research can keep teachers motivated to conduct successful research.

However, the study also found that administrative support had a significant negative impact on workload and unrest impact in the area at the .05 level. It is possible that teachers were already aware of their scope of work and responsibilities, both related to teaching and learning and other assigned functions. Furthermore, most teachers may understand the unrest situation in the area, so administrators may not be a significant factor affecting their duties in this context. While some schools may not have a full-time administrator, teachers were still able to perform their duties effectively. However, it's worth noting that this may not be applicable to all schools or situations, and having a dedicated administrator could provide additional support and resources for teachers. The findings align with Khampol [25] which highlights the importance of two factors in the success of education management in the deep south provinces: the quality of administrators and teacher sacrifice.

6. Conclusion

The hypothesis test results indicated that only six out of twelve hypotheses were supported, with the curriculum and training quality and outstanding position factors directly impacting classroom research skills. Additionally, the results showed that other knowledge and attitudes were also influenced by curriculum and training quality, and administrative support acted as an extension of teachers' motivation to conduct research in the classroom. These findings suggest that those involved in teacher development in Thailand should regularly incorporate research knowledge into the classroom to increase teachers' confidence and ability to conduct successful research. Further research could explore what kind of research curriculum would be most effective for undergraduate student teachers, enabling them to become durable teachers who can effectively utilize research in their routine work. It would also be interesting to investigate what kind of training would extend teachers' knowledge of conducting research in the classroom, potentially with the involvement of mentors with high academic standing.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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