



A development model for preservice language teachers to promote active learning management



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ABSTRACT

Active learning has become essential in 21st-century education because it promotes learner engagement and higher-order thinking, while structured development models can support preservice teachers in effectively managing active learning environments. The purposes of this study were to: (1) examine and validate the components of active learning management competency; (2) investigate the current and desirable states and identify development needs; (3) develop a model to enhance active learning management competency; and (4) evaluate the effectiveness of the developed model. The participants included more than 300 undergraduate students for construct validation, 39 participants for needs analysis, 5 experts for model evaluation, and 60 preservice teachers for model implementation. The research instruments included a competency assessment form, a needs assessment questionnaire, a model evaluation form, a cognitive achievement test, and a satisfaction questionnaire. The data were analyzed using percentage, mean, standard deviation, confirmatory factor analysis (CFA), the Modified Priority Needs Index (PNI_modified), and a paired-samples t-test. The results showed that active learning management competency consisted of six components, the developed model demonstrated a good fit with the empirical data, all components required development, and implementation of the model significantly improved preservice teachers' cognitive achievement and active learning management competency, with satisfaction at the highest level. This study contributes by providing a validated and practical model for systematically developing active learning management competency in teacher education.

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1. Introduction

In the context of 21st-century education, the shift from teacher-centered instruction to learner-centered approaches has become increasingly important for promoting meaningful learning and higher-order thinking skills (Bell, 2010; Guo, 2014). Among these approaches, active learning has been widely recognized as an effective pedagogical

practice that engages learners through participation, interaction, and reflection (Prahani and Cheng, 2020). According to Anthony (1996), in an active learning environment, rather than receiving knowledge passively, students construct understanding through activities such as discussion, problem-solving, collaboration, and inquiry. Consequently, the role of teachers has evolved from knowledge transmitters to facilitators who design and manage dynamic learning environments.

In teacher education, particularly in language-related disciplines, the ability to implement active instruction is considered a crucial competency (Chaipibal and Chittranun, 2025; Ishii, 2017). Language preservice teachers, are expected to possess content knowledge. However, in the new paradigm of language education, they are obligated

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to design instructional activities that improve student engagement and interaction. This expectation is reinforced by the policy of the Ministry of Education, which mandates the use of active learning approaches to enhance learner-centered outcomes. Accordingly, the ability to manage active learning has become a professional responsibility for preservice teachers. However, in practice, many still rely on traditional teaching methods that emphasize lecturing and rote learning (Nasri, 2019). This situation reflects a lack of systematic training and structured support for developing competencies related to active learning management, including planning, implementation, reflection, and evaluation.

Despite its policy emphasis and pedagogical significance, developing preservice teachers' ability to effectively implement active learning remains a complex challenge. Active learning management requires the integration of multiple interrelated competencies, such as designing learner-centered activities, facilitating classroom interaction, applying appropriate teaching strategies, reflecting on instructional practices, and continuously improving learning outcomes (Pusing, 2026). In addition, preservice teachers must be able to seek new knowledge and innovations, analyze problems arising from their own teaching, and utilize evaluation results for ongoing development (Tondeur et al., 2017). These competencies are inherently multidimensional, making them difficult to cultivate through conventional training approaches that often separate theory from practice. As a result, preservice teachers may struggle to translate conceptual understanding into effective classroom implementation.

Furthermore, teacher education programs often lack an integrated framework that clearly defines the components of active learning management and provides a systematic process for competency development (Kaoropthai and Boonmoh, 2023). Without such a framework, preservice teachers may encounter difficulties in applying theoretical knowledge to real classroom contexts. Therefore, there is a need to establish a comprehensive model that not only identifies the essential competencies required for active learning but also offers a structured and practical approach for developing these competencies in a measurable manner.

To address this need, this study aims to develop a model to enhance active learning management competency among language preservice teachers. The study focuses on identifying and validating the components of active learning competency, examining the current and desirable states of such competency, and designing a structured development model. In addition, the study investigates the effectiveness of the developed model in improving preservice teachers' knowledge, competency, and satisfaction. The findings are expected to contribute to teacher education by providing a practical and validated framework for promoting active learning in language instruction.

2. Literature review

Active learning has been a prominent pedagogical approach for several decades, emerging from the shift toward student-centered learning paradigms in modern education. It is generally defined as the active engagement of students in the learning process through meaningful activities such as discussion, collaboration, problem-solving, and inquiry, rather than passive listening (Fornari and Poznanski, 2021). Rooted in constructivist principles, active learning emphasizes that learners construct knowledge through experience and interaction, leading to deeper understanding and more meaningful learning outcomes (Anthony, 1996). Over time, this approach has been widely recognized for its ability to enhance student engagement, improve comprehension, and foster higher-order thinking skills, including analysis, synthesis, and evaluation. In the context of language teaching, active learning is particularly crucial due to the inherently interactive nature of language use. Language learning requires learners to engage in communication, negotiation of meaning, and the co-construction of knowledge, all of which align closely with active learning principles.

This study is primarily grounded in constructivist learning theory, which views learning as an active process in which individuals construct knowledge through experience, interaction, and reflection. From a constructivist perspective, meaningful learning occurs when learners actively engage with content, collaborate with others, and connect new knowledge with prior experiences. These principles closely align with active learning and provide a theoretical foundation for the development of active learning management competency among preservice teachers.

Therefore, the integration of active learning is not merely an instructional choice but a fundamental component of effective language pedagogy. This is especially important in the preparation of preservice teachers, who are expected to facilitate communicative and learner-centered classrooms. As future educators, they must be equipped with the ability to design engaging language activities, promote interaction, and adapt instruction to diverse learners (Intasena et al., 2025). Without these competencies, preservice teachers may struggle to create meaningful language learning experiences, highlighting the critical role of active learning in developing effective language teachers.

Attempts have been made to understand the importance of active learning and to develop preservice teachers' competencies in implementing learner-centered instruction, particularly in language education contexts. Existing studies indicate that preservice teachers generally hold positive attitudes toward innovative and student-centered pedagogies; however, their practical knowledge and ability to implement such approaches remain limited. For instance, research on digital-game-based language learning revealed that

preservice teachers demonstrated favorable perceptions of using interactive tools in teaching, yet lacked sufficient practical knowledge to effectively integrate these approaches into classroom instruction (Belda-Medina and Calvo-Ferrer, 2022). Similarly, studies examining technological integration through frameworks such as TPACK found that preservice teachers possess moderate levels of technological and pedagogical knowledge, suggesting a gap between conceptual understanding and practical application (Bautista et al., 2024; Hastomo et al., 2024).

In addition to perceptions and readiness, several studies have explored preservice teachers' experiences with active learning and related instructional approaches. Findings indicate that while preservice teachers are exposed to a variety of instructional methods, including active, interactive, and traditional approaches, passive instruction often remains prevalent in practice. Nevertheless, preservice teachers tend to demonstrate high levels of motivation and engagement when exposed to active learning environments, highlighting the potential of such approaches in teacher education (Halimi et al., 2024). Furthermore, studies investigating preservice teachers' readiness to integrate innovative tools, such as artificial intelligence, have shown that their competencies are interconnected across multiple domains, including technological, pedagogical, and ethical dimensions, reinforcing the need for comprehensive competency development (Bautista et al., 2024; Hastomo et al., 2024).

Efforts to develop preservice teachers' competencies have also been implemented through various instructional models and training programs. For example, the use of flipped classroom approaches, gamification, and microlearning-supported instruction has been shown to improve preservice teachers' learning performance, motivation, and engagement (Candel et al., 2024; Fidan, 2023). These approaches emphasize student-centered learning and provide opportunities for active participation, reflection, and collaboration, which are essential elements of active learning. Similarly, structured programs based on frameworks such as TPACK have demonstrated effectiveness in enhancing preservice teachers' teaching expertise, particularly in integrating emerging technologies into instructional practices (Kim, 2024). These findings suggest that targeted interventions can positively influence preservice teachers' competencies; however, such efforts are often implemented as isolated strategies rather than as part of a comprehensive and systematic development framework.

Despite these advancements, several limitations remain evident in the existing body of research. Many studies focus primarily on preservice teachers' perceptions, readiness, or the outcomes of specific instructional interventions, with limited attention given to systematically identifying and validating the

underlying competency structure required for effective active learning management.

In addition, there is a lack of comprehensive development models that integrate competency identification, needs assessment, and structured implementation processes within a single framework. Furthermore, few studies employ rigorous validation techniques, such as Confirmatory Factor Analysis (CFA), in conjunction with Research and Development (R&D) methodologies to establish both theoretical and practical foundations for competency development.

To address these gaps, this study aims to develop a model to enhance active learning management competency among language preservice teachers. Specifically, the objectives of this study are to: (1) study and verify the construct validity of the components of active learning management competency; (2) examine the current state, desirable state, and needs for developing such competency; (3) develop a student development model to promote active learning management; and (4) investigate the effects of implementing the developed model.

3. Methodology

3.1. Research design

This study employed a Research and Development (R&D) design to develop and evaluate a model for enhancing active learning management competency among language preservice teachers. The research was conducted in four sequential phases to ensure both theoretical validation and practical applicability. The first phase focused on synthesizing and validating the components of active learning management competency using Confirmatory Factor Analysis (CFA). The second phase examined the current state, desirable state, and priority needs for competency development through a needs assessment approach. In the third phase, a student development model was designed based on the findings from the previous phases and relevant theoretical frameworks. The fourth phase involved implementing the developed model with preservice teachers and evaluating its effectiveness in improving knowledge and competency through a pretest-posttest design.

3.2. Participants

The participants in this study were selected according to the requirements of each research phase. In Phase 1, which involved construct validation through Confirmatory Factor Analysis (CFA), the sample consisted of undergraduate students majoring in Language from higher education institutions in the Roi Kaen Sara Sin region (Roi Et, Khon Kaen, Maha Sarakham, and Kalasin). A total of at least 300 participants were selected using multi-stage random sampling to ensure an adequate sample size for factor analysis.

In Phase 2, participants included 4 instructors responsible for the language teacher education program and 35 undergraduate students majoring in Language, resulting in a total of 39 participants. These participants were selected purposively to provide information regarding the current state, desirable state, and development needs related to active learning management competency.

In Phase 3, 5 experts in curriculum and instruction, teacher education, and language teaching were invited to evaluate the suitability and feasibility of the developed model. The experts were selected based on their academic qualifications and professional experience in relevant fields.

In Phase 4, the developed model was implemented with 60 undergraduate students majoring in Language at the Faculty of Education, Mahasarakham University. The participants were selected using purposive sampling, as they were enrolled in a teacher education program and were considered appropriate for the implementation and evaluation of the model.

3.3. Research instruments

The active learning management competency assessment form was used to measure preservice teachers' competency across six components and 24 behavioral indicators. The instrument consisted of 24 items using a five-point Likert scale. The instrument was evaluated to be with content validity ($IOC = 0.80-1.00$), appropriate item discrimination ($r = 0.384-0.729$), and high reliability ($\alpha = 0.93$).

The needs assessment questionnaire was used to examine the current state, desirable state, and priority needs for developing active learning management competency. The instrument consisted of 24 items using a five-point Likert scale. The questionnaire was evaluated to be with content validity ($IOC = 0.80-1.00$), appropriate item discrimination ($r = 0.693-0.851$), and high reliability ($\alpha = 0.96$). The model evaluation form was used to assess the suitability and feasibility of the developed model by five experts. The instrument was designed as a five-point Likert scale questionnaire and was evaluated to be with content validity ($IOC = 0.80-1.00$) and high reliability ($\alpha = 0.92$).

The cognitive achievement test was used to measure preservice teachers' knowledge of active learning management before and after the implementation of the model. The test consisted of 30 items and was evaluated to be with content validity ($IOC = 0.80-1.00$), appropriate item difficulty ($p = 0.45-0.77$), item discrimination ($d = 0.22-0.85$), and high reliability ($\alpha = 0.97$).

The active learning management competency assessment form was developed based on a synthesis of relevant literature and the construct validation results from Phase 1, which identified six components and 24 behavioral indicators. The instrument was designed as a rating scale with analytic rubrics consisting of four performance levels (4 = very good, 3 = good, 2 = fair, and 1 =

needs improvement), covering all behavioral indicators. The content validity of the instrument was evaluated by five experts using the Index of Item-Objective Congruence (IOC), with values ranging from 0.80 to 1.00. Items with IOC values below 0.50 were revised based on expert recommendations. The finalized instrument demonstrated high inter-rater reliability and was used as the primary tool for assessing preservice teachers' competency during the implementation phase.

The satisfaction questionnaire was used to assess preservice teachers' perceptions toward the developed model after implementation. The instrument consisted of 15 items using a five-point Likert scale and was evaluated to be with content validity ($IOC = 0.80-1.00$) and high reliability ($\alpha = 0.95$).

3.4. Data collection and data analysis

Data collection was conducted after ethical approval had been granted and within the approved research period. Data collection was conducted in accordance with the four phases of the study as discussed earlier in research design. The data were analyzed using both descriptive and inferential statistics. Percentage, mean, and standard deviation were used to describe general data characteristics. Confirmatory Factor Analysis (CFA) was employed to verify the construct validity of the active learning management competency components, with model fit evaluated using indices including χ^2/df , RMSEA, CFI, TLI, and SRMR.

The Modified Priority Needs Index (PNI_modified) was used to analyze the needs assessment data. In addition, a paired-samples t-test was conducted to compare pretest and posttest scores in order to determine the effectiveness of the developed model. All statistical analyses were performed at a significance level of .05.

4. Results

4.1. Construct validation of active learning management competency

The components of active learning management competency were initially identified through a synthesis of relevant documents, theories, and prior research. The analysis resulted in six main components with 24 behavioral indicators, reflecting the multidimensional nature of active learning management. These components served as the conceptual framework for developing the competency assessment instrument. The details of the components are presented in [Table 1](#).

Following this, data were collected from 300 undergraduate students majoring in Language from higher education institutions in the Roi Kaen Sara Sin region to examine the construct validity of the proposed components. The participants were

selected using multi-stage random sampling. The demographic characteristics of the sample indicated that the majority were female (71.67%), while males accounted for 28.33%. In terms of academic level,

51.67% were fourth-year students and 48.33% were third-year students, reflecting a balanced representation of preservice teachers suitable for Confirmatory Factor Analysis (CFA).

Table 1: Components and indicators of active learning management competency

Factors	Indicators
1. Fundamental knowledge of active learning management (FKA)	1. Knowledge and understanding of concepts, principles, and roles of teachers and learners in the classroom 2. Knowledge of designing active learning activities 3. Knowledge of selecting appropriate media, innovations, and learning resources 4. Knowledge of measurement and evaluation
2. Skills in designing language learning (SDL)	5. Ability to analyze curriculum, learning standards, and define learning objectives in language 6. Ability to design learning units and lesson plans in language 7. Ability to design activities emphasizing thinking, practice, and participation 8. Ability to design assessment aligned with learning activities
3. Skills in organizing active language learning activities (SOL)	9. Ability to apply teaching techniques and questioning strategies to promote active learning and higher-order thinking 10. Ability to organize group work, discussion, and collaborative learning 11. Ability to use media, technology, and learning resources in instruction 12. Ability to manage classroom and create an active learning environment 13. Positive attitudes and self-confidence in active learning management
4. Student characteristics and attitudes toward active learning management (SCA)	14. Enthusiasm and motivation for professional self-development 15. Responsibility toward professional roles as a language teacher 16. Openness to new ideas and readiness for educational change 17. Ability to reflect on and analyze problems in one's own teaching 18. Ability to improve teaching practices based on reflection
5. Reflective practice and professional development ability (RPD)	19. Ability to seek knowledge and innovations for professional development 20. Ability to use evaluation results for continuous improvement
6. Integration of language teaching with 21st-century learning contexts (ITT)	21. Ability to integrate 21st-century skills and digital technology into language instruction 22. Ability to connect language content with real-life and contemporary contexts 23. Ability to promote critical thinking, communication, and creativity 24. Ability to design learning considering individual differences

As shown in Table 2, the results of the Confirmatory Factor Analysis indicated that the measurement model demonstrated a good fit with the empirical data ($\chi^2/df = 1.51$, $p = 0.06$, $CFI = 1.00$, $TLI = 1.00$, $RMSEA = 0.02$, $SRMR = 0.00$). All indicators were statistically significant, with standardized factor loadings ranging from 0.49 to 0.95. At the second-order level, all six components contributed to the overall construct, with factor loadings ranging from 0.74 to 0.99. Among these, Fundamental Knowledge of Active Learning Management (FKA) showed the highest contribution, followed by Skills in Designing Language Learning (SDL) and Skills in Organizing Active Learning Activities (SOL). These results confirm the construct validity of the proposed model. The CFA model can be illustrated in Fig. 1.

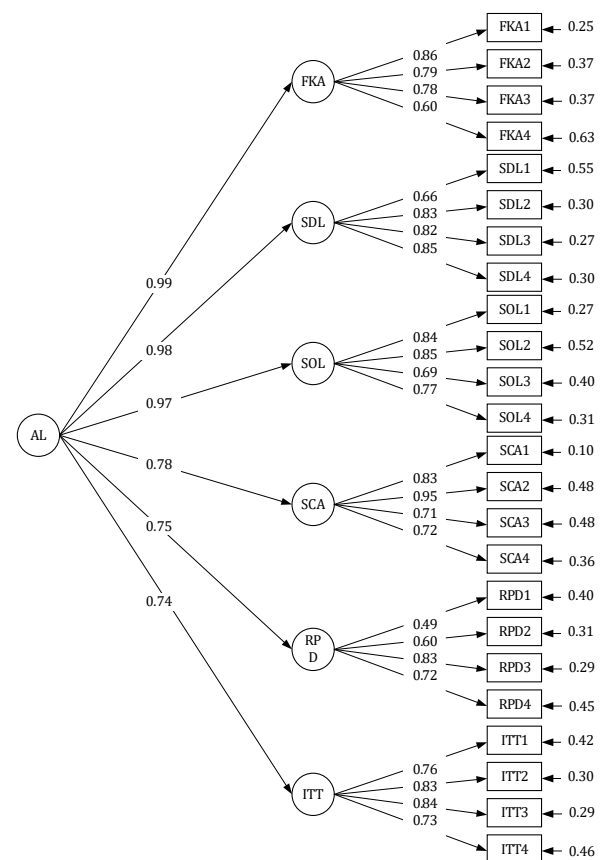
Table 2: Second-order confirmatory factor analysis of active learning management competency

Component	β	R^2
Fundamental knowledge of active learning management	0.99	0.87
Skills in designing language learning	0.98	0.86
Skills in organizing active learning activities	0.97	0.87
Student characteristics and attitudes	0.78	0.61
Reflective practice and professional development	0.75	0.76
Integration with 21st-century learning contexts	0.74	0.77

4.2. Needs analysis of active learning management competency

The needs analysis was conducted to examine the current state, desirable state, and priority needs for developing active learning management competency among preservice teachers. Data were collected from instructors and undergraduate students using a structured questionnaire, and the Modified Priority Needs Index (PNI_modified) was used to identify the priority of development needs. Table 3 indicates that the results of the needs analysis revealed that the overall level of active learning management

competency was at a moderate level, while the desirable level was at the highest level across all components. The analysis of PNI_modified indicated that all components required further development.



$$\chi^2 = 34.78, df = 23, \chi^2_{df} = 1.51, p = 0.06, CFI = 1.00, TLI = 1.00, RMSEA = 0.02, SRMR = 0.00$$

Fig. 1: Confirmatory factor analysis of active learning management competency

Reflective Practice and Professional Development showed the highest priority need (PNI_modified =

0.53), followed by Skills in Designing Language Learning (PNI_modified = 0.52), Integration with 21st-Century Learning Contexts (PNI_modified = 0.51), Skills in Organizing Active Learning Activities (PNI_modified = 0.50), Fundamental Knowledge of Active Learning Management (PNI_modified = 0.48),

and Student Characteristics and Attitudes (PNI_modified = 0.47), respectively. These findings indicate a clear gap between the current and desired competencies, highlighting the need for a systematic development model to enhance preservice teachers' active learning management competency.

Table 3: Results of needs analysis of active learning management competency

Component	Current state (mean)	Desirable state (mean)	PNI_modified	Priority rank
Reflective practice and professional development	3.05	4.68	0.53	1
Skills in designing language learning	3.10	4.70	0.52	2
Skills in organizing active learning activities	3.12	4.69	0.50	4
Fundamental knowledge of active learning management	3.15	4.67	0.48	5
Integration with 21st-century learning contexts	3.08	4.65	0.51	3
Student characteristics and attitudes	3.20	4.72	0.47	6

4.3. Model evaluation

The developed model for enhancing active learning management competency was evaluated by five experts in the fields of curriculum and instruction, teacher education, and language teaching. The evaluation focused on the suitability and feasibility of the model using a structured assessment form.

The results in Table 4 indicate that the overall suitability of the model was at the highest level ($M = 4.79$, $S.D. = 0.40$), and the feasibility was also at the highest level ($M = 4.57$, $S.D. = 0.50$). These findings suggest that the developed model is appropriate, practical, and applicable for enhancing preservice teachers' active learning management competency. Therefore, the model was considered ready for implementation in the next phase of the study.

Table 4: Results of model evaluation

Evaluation aspect	M	S.D.	Level
Suitability of the model	4.79	0.40	Highest
Feasibility of the model	4.57	0.50	Highest
Overall	4.68	0.45	Highest

4.4. Model implementation

According to Table 5, the results revealed a substantial increase in preservice teachers' cognitive achievement after the implementation of the model. The mean score increased from 15.20 in the pretest to 24.80 in the posttest, indicating a clear

improvement in knowledge related to active learning management. The paired-samples t-test confirmed that this difference was statistically significant at the 0.001 level. This finding suggests that the developed model was highly effective in enhancing preservice teachers' conceptual understanding and knowledge base. As shown in Table 6, the results indicated that preservice teachers' active learning management competency after the implementation was significantly higher than before the implementation at the 0.01 level. The overall mean score increased from 49.17 to 86.78, demonstrating a substantial improvement in competency. When considered by component, significant improvements were found across all six components. The greatest improvement was observed in Skills in Organizing Active Learning Activities, followed by Reflective Practice and Professional Development.

These findings suggest that the developed model was highly effective in enhancing both the practical and reflective aspects of active learning management. The improvement across all components indicates that the model successfully supported comprehensive competency development rather than isolated skill enhancement.

Table 5: Comparison of pretest and posttest cognitive achievement scores

Test	M	S.D.	t	p-value
Pretest	15.20	2.85		
Posttest	24.80	2.10	18.45	0.000

Table 6: Comparison of pretest and posttest active learning management competency by component ($n = 60$)

Component	Pretest (M)	S.D.	Posttest (M)	S.D.	t	p-value
Fundamental knowledge of active learning	9.20	1.33	14.62	1.03	-26.99	0.000
Skills in designing language learning	8.85	1.60	14.52	1.09	-23.88	0.000
Skills in organizing active learning activities	6.50	1.17	14.30	1.15	-37.94	0.000
Student characteristics and attitudes	8.75	1.35	14.63	1.19	-24.62	0.000
Reflective practice and professional development	6.82	1.17	14.28	1.19	-32.49	0.000
Integration with 21st-century learning contexts	9.05	1.52	14.43	1.14	-21.49	0.000
Overall	49.17	2.82	86.78	2.82	-79.12	0.000

Following the implementation, preservice teachers' satisfaction toward the developed model was assessed to examine its practicality and acceptance. The satisfaction questionnaire consisted of 15 items covering aspects such as learning environment, instructional process, reflection, and professional development. The results indicated that preservice teachers' overall satisfaction with the developed model was at the highest level ($M = 4.80$, $S.D. = 0.38$). All items were rated at the highest level,

reflecting strong positive perceptions toward the model (Table 7). The highest-rated items included feeling proud of teaching improvement observed through video reflection ($M = 4.92$), the supportive and non-judgmental coaching atmosphere ($M = 4.90$), and increased comfort through the use of video recording instead of direct observation ($M = 4.88$). These findings suggest that the model not only enhanced competency but also created a supportive learning environment that fostered confidence,

reflection, and professional growth. The consistently high satisfaction across all items further confirms the

practicality and acceptability of the model for use in teacher education contexts.

Table 7: Preservice teachers' satisfaction toward the developed model (n = 60)

Item	Evaluation statement	M	S.D.	Level
1	I appreciated the supportive and non-judgmental communication atmosphere with the coach.	4.90	0.30	Highest
2	I felt more comfortable and less anxious when video recording was used instead of direct observation.	4.88	0.32	Highest
3	I gained clearer insights into my teaching and weaknesses through video reflection.	4.85	0.36	Highest
4	I preferred reflective questioning rather than being given direct answers.	4.78	0.42	Highest
5	I felt encouraged by constructive feedback.	4.86	0.35	Highest
6	I developed a deeper understanding of active learning lesson planning.	4.72	0.45	Highest
7	I enjoyed designing engaging Thai language activities with reduced lecturing.	4.68	0.50	Highest
8	I valued the opportunity to practice teaching and improve based on feedback.	4.82	0.39	Highest
9	I felt more confident teaching in real classroom situations.	4.75	0.43	Highest
10	I appreciated the availability of teaching media and digital platforms.	4.65	0.48	Highest
11	My problem-solving skills in classroom situations improved.	4.70	0.46	Highest
12	I valued opportunities for reflection and self-evaluation.	4.80	0.40	Highest
13	I felt proud of my teaching improvement observed in the second video.	4.92	0.27	Highest
14	I developed a growth mindset toward becoming a better teacher.	4.84	0.37	Highest
15	I would recommend this model for use in other teaching practicum courses.	4.88	0.32	Highest
Overall		4.80	0.38	Highest

5. Discussion

The findings of this study provide empirical support for the multidimensional nature of active learning management competency among language preservice teachers. The results from the confirmatory factor analysis confirmed that the competency consists of six interrelated components. The results of the study suggest that, to prepare individuals to effectively teach in an active learning environments, they should possess fundamental knowledge of active learning, as it provides the conceptual foundation for understanding learner-centered pedagogy and the roles of teachers and students. This foundational knowledge enables preservice teachers to design meaningful and engaging learning experiences (Ishii, 2017). In addition, skills in designing language learning are essential, as they allow teachers to plan structured activities that promote interaction, critical thinking, and student participation, which in turn enhances learning effectiveness. Similarly, skills in organizing active learning activities are crucial for managing classroom dynamics, facilitating collaboration, and ensuring that learning activities are implemented effectively in real classroom situations (Intasena et al., 2025).

Furthermore, student characteristics and attitudes toward active learning play a significant role, as positive attitudes and professional commitment influence teachers' willingness to adopt and sustain learner-centered practices. Reflective practice and professional development are also necessary, as they enable teachers to evaluate their own teaching, identify areas for improvement, and continuously refine their instructional strategies (Guo, 2014). Finally, integration with 21st-century learning contexts ensures that teaching practices remain relevant by incorporating real-world contexts, digital technologies, and essential skills such as critical thinking and communication.

An interesting finding was that Reflective Practice and Professional Development demonstrated the highest developmental need during the needs assessment phase, whereas the greatest improvement after implementation was

observed in Skills in Organizing Active Learning Activities. One possible explanation is that reflective practice requires sustained experience and continuous self-evaluation, making it more difficult to develop than practical instructional skills within a relatively short intervention period. In contrast, opportunities for lesson implementation, coaching, and repeated teaching practice provided direct experiences that immediately strengthened participants' ability to organize active learning activities. This finding suggests that different competency dimensions may develop at different rates and may require different forms of support.

The importance of developing active learning competency among preservice teachers is further reinforced by previous studies. Research on preservice teachers' perceptions has shown that although they generally hold positive attitudes toward active learning and recognize its benefits, they often lack the practical skills and confidence to implement it effectively in real classrooms (Bautista et al., 2024; Belda-Medina and Calvo-Ferrer, 2022). This gap between perception and practice highlights the necessity of systematically developing both knowledge and skills in teacher education programs. The findings of this study align with these prior studies by demonstrating that preservice teachers require structured support to translate their understanding of active learning into effective instructional practices.

Furthermore, the effectiveness of the developed model is evident in the significant improvement in both cognitive achievement and active learning management competency after implementation. These results indicate that the model successfully facilitated both conceptual understanding and practical application. This finding is consistent with previous studies that have demonstrated the effectiveness of structured instructional models and innovative teaching approaches, such as flipped classrooms, gamification, and microlearning, in enhancing preservice teachers' learning outcomes and engagement (Candel et al., 2024; Fidan, 2023; Kim, 2024). These studies suggest that well-designed learning models that incorporate active participation, collaboration, and reflection can

significantly improve both knowledge and competency.

The success of the developed model in this study can be attributed to its systematic design, which integrates key elements of active learning, including activity-based learning, collaborative engagement, and reflective practice. It is suggested that providing preservice teachers with opportunities to actively participate in the learning process, apply knowledge in practical contexts, and reflect on their experiences can support deeper learning and competency development. This aligns with the principles of active learning and confirms that using a structured model can lead to meaningful improvements in both cognitive and practical outcomes. Although participants reported the highest level of satisfaction across all aspects of the model, these findings should be interpreted with caution. Since the data were collected through self-report measures, the possibility of social desirability bias cannot be completely ruled out. Participants may have provided favorable responses due to positive relationships with instructors, perceived expectations, or their involvement in the intervention. Future studies may incorporate interviews, observations, or anonymous evaluations to obtain a more comprehensive understanding of participants' perceptions.

6. Conclusion

This study developed and validated a model for enhancing active learning management competency among language preservice teachers using a Research and Development approach. The study integrated construct validation, needs analysis, model development, and implementation to ensure both theoretical and practical relevance. The findings revealed that the developed model effectively improved preservice teachers' cognitive achievement and active learning management competency, with high levels of participant satisfaction.

This study contributes to the field of teacher education by providing a comprehensive and empirically validated framework that integrates knowledge, skills, attitudes, and reflective practices for managing active learning. The identified six components offer a clear structure for designing competency-based development programs, while the validated model demonstrates how these components can be systematically developed in practice.

In terms of implications, the findings suggest that teacher education programs should adopt structured development models that emphasize active learning principles, practical application, and reflective practice to better prepare preservice teachers for contemporary classrooms. However, this study is limited by its focus on a specific group of language preservice teachers within a particular regional context, which may affect the generalizability of the findings. Future research should explore the

application of the model in different subject areas, educational levels, and cultural contexts, as well as examine its long-term impact on teaching practices and student learning outcomes. Another limitation of this study is the use of a one-group pretest-posttest design without a control group. Although the findings demonstrated significant improvements in cognitive achievement and active learning management competency, the absence of a comparison group limits the ability to attribute these improvements solely to the developed model. Future studies should employ experimental or quasi-experimental designs with control groups to provide stronger evidence regarding the effectiveness of the model.

The cognitive achievement test demonstrated very high reliability ($\alpha = .97$), which may indicate overlap among some items. Although high reliability is desirable, future studies should further examine item redundancy and consider reducing the number of items while maintaining adequate psychometric quality.

List of abbreviations

AL	Active learning
CFA	Confirmatory factor analysis
CFI	Comparative fit index
FKA	Fundamental knowledge of active learning management
IOC	Index of item-objective congruence
ITT	Integration of language teaching with 21st-century learning contexts
PNI_modified	Modified Priority Needs Index
R&D	Research and development
RPD	Reflective practice and professional development ability
SCA	Student characteristics and attitudes toward active learning management
SDL	Skills in designing language learning
SOL	Skills in organizing active language learning activities
SRMR	Standardized root mean square residual
TLI	Tucker-Lewis index
TPACK	Technological pedagogical content knowledge

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Compliance with ethical standards

Ethical considerations

The study was reviewed and approved by the Mahasarakham University Ethics Committee for Research Involving Human Subjects, Thailand, under Approval No. 847-784/2025. The study was conducted in accordance with ethical principles for research involving human subjects. Participation was voluntary, informed consent was obtained as appropriate, and all data were treated confidentially and used solely for research purposes.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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