Empowering teachers: a growth mindset program for enhanced facilitating learning in primary schools

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Article Info

ABSTRACT

Teachers who adopt a growth mindset significantly enhance student development, facilitating learning, and continuous improvement, leading to better student learning outcomes and a more positive learning environment. This research aimed to develop a growth mindset to improve the facilitating learning skills of primary school teachers. The research utilized a development (R&D) method, structured into four phases: i) analyzing components and indicators; ii) assessing needs; iii) developing the program; and iv) implementing the program. The study focused on creating training to influence teachers' mindsets and drive changes in practice. A mixed methods design was used, with the growth mindset development program consisting of 6 modules over 120 hours. This program incorporated training or self-learning, learning through collaboration, and integrating operational practices, involving 15 volunteer teachers. Results indicated a statistically significant shift in mindset between pre-and post-intervention measures, which was sustained after three months. The program fostered a professional learning community focused on developing a growth mindset, refining teaching techniques, and enhancing student learning outcomes. Overall, the growth mindset program proved highly effective for primary school teachers, greatly expanding their knowledge and cultivating a professional learning community that positively impacts student development and facilitating learning skills of teachers.

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1. INTRODUCTION

Sustainable national development is the main goal that all government agencies must operate by and integrate towards the goals set out in the 20-year national strategy and must be put into practice so that Thailand can achieve its vision, have security, prosperity, and sustainability and be a developed country by developing according to the Sufficiency Economy Philosophy in the six national strategies. An area that is important to educational development is the development and enhancement of human resources. The importance of teacher development has been included in the National Education Act B.E. 2542, amended (No. 2) B.E. 2545, Chapter 7: Teachers, Faculty Staff, and Educational Personnel, Section 52, the Ministry shall promote a system for developing teachers, faculty staff, and educational personnel to have quality and standards suitable for being a high profession by directing and coordinating the institutions responsible for producing and developing teachers, faculty staff, and educational personnel to be ready and robust in preparing new personnel and continuously developing regular personnel [1]. There is no denying that mindset is very important for managing our daily lives. The behavior one displays is a result of each one's

inner mindset [2] defined a mindset as a person's mindset or way of thinking that affects behavior and causes people to have different perspectives on the same issue, which lets us know that when any person is faced with a particular situation, his or her behavior will show differently, which depends on the thoughts and experiences that have been accumulated. Methods for solving problems and solving situations vary. The most important thing is that the person must first understand his or her mindset and find a way to get through the situation. Mindset is divided into two types: i) fixed mindset, which believes that intelligence and cleverness are innate skills and cannot be increased, developed, and changed and ii) growth mindset, which believes that every person is ready to develop and change themselves, to seek knowledge, and to create learning through effort, determination, and dedication in learning [3], [4].

In cultivating any person to have a growth mindset, the important person is the teacher who instills a mindset in the students. Developing a growth mindset is very important to teachers because when teachers' perspectives and attitudes about learning change, it positively affects both teachers and students. Dweck *et al.* [5] stated that people have different ideas and beliefs about their intelligence abilities. Some teachers and students think and believe that their intellectual abilities cannot be changed. This type of belief creates a fixed mindset that cannot be changed and developed. On the contrary, some teachers and students believe that intellectual abilities can be trained and developed through application and guidance. Self-improvement allows them to leave their comfort zone, dare to step into the learning zone and be ready to develop themselves to move towards their goals.

This is in line with the policy to raise the quality of teachers in the 21st century, one of which is that teachers must continuously seek knowledge and have knowledge and ability. Therefore, the production of teachers must be reformed to keep the education system up to date in line with the changes. Teacher development is a matter of great importance. Preparing teachers in the 21st century prepares people to become knowledge workers and learning learners. One of the most essential skills of the 21st century is learning skills, which include critical thinking, problem-solving, lifelong learning, and the ability to adapt to rapid changes [6]. These skills enable individuals to navigate an increasingly complex world filled with information and uncertainty. In the context of teaching, learning skills are crucial for continuous professional development (CPD) and for responding effectively to the diverse needs of learners.

Developing teachers with a growth mindset is vital for educational transformation. When teachers view intelligence and abilities as qualities that can be developed, they are more likely to adopt innovative teaching strategies and persist in overcoming classroom challenges. This not only enhances their own professional growth but also fosters a classroom environment that supports student resilience and motivation. According to Hattie [7], teacher mindsets and expectations significantly impact student achievement. This is consistent with Hoskins [8], who stated that no one has attempted or at least published an attempt to support the growth of ideas by working with teachers to support this growth in their students. There are several reasons why this should be done; for example, teachers know their students best and can tailor their intervention to the student; teachers can have a strong positive influence on students; teacher expectations influence students' aspirations, expectations, and success. According to the literature review, there is a consensus that when teachers expect students to do well and show intellectual growth, students will do. Meanwhile, if teachers have no expectations, the student's performance and growth will not be promoted and may be hindered in various ways. This is consistent with a study by Jussim and Eccles [9] that found that teachers' expectations toward students, whether positive or negative and the theories they build about their potential can have a powerful influence on the academic achievement of those students.

To develop learners with a growth mindset for success, teachers or coaches must first have a growth mindset. Because teachers' growth mindsets influence learning management and coaching behavior, as well as learners' perceptions and learning experiences, learners develop growth mindset characteristics [10]. Teachers with a growth mindset believe that all students are valuable and should be respected. They can learn, but it requires different learning processes and time. Everyone has the opportunity to succeed in their studies, and everyone has the potential to develop themselves so that they can succeed on their own. They are open-minded, always listening, and looking for new ideas. They creatively communicate their students' progress to parents and guardians, and they develop new learning methods that allow students to learn the most and increase their chances of success [4], [11].

The development program in this section will focus on developing a growth mindset to improve primary school teachers' facilitating learning, which is regarded as an important part because it provides a perspective on overall facilitating learning and plays an important role in supporting and promoting facilitating learning to achieve results. The primary school teachers play an important role in this section. Teachers' behaviors, whether positive or negative, have a direct influence and impact on students. As a result, the characteristics of growth mindset teachers will have an impact on how learners' growth mindsets develop. This is because teachers' growth mindsets influence their facilitating learning behaviors, which in turn influence the learning experiences that students receive [10]. As a result, teachers must constantly learn

and develop to become people with a growth mindset, because students who study with teachers who have developed skills to build a growth mindset outperform students who do not have such skills [12].

The majority of the research in Thailand has focused on university educators who provide direct interventions to students. No one has attempted, or at least not published, an effort to promote the development of a growth mindset in students by collaborating with teachers. Teachers must develop a growth mindset because they are the best people to understand their students and tailor interventions to them. Teachers can exert a significant positive influence on students. Teachers' expectations have been found to influence students' motivation, expectations, and achievement. In general, research shows that if teachers expect their students to succeed and grow intellectually, students will follow. However, if teachers do not have these expectations, students' learning and development may not be supported, and in some cases may even be hampered. Teachers' expectations of students' abilities, whether positive or negative, can have a significant impact on their academic performance. As a result, if teachers expect students to develop their abilities, they must also be capable of doing so [13].

This study demonstrates that teacher training can influence students' mindsets. Teacher training is also a low-cost way to have an impact on students, making it an intervention that the basic education commission and schools can fund. Finally, training teachers in a growth mindset to improve teacher learning management will contribute to long-term support in schools, rather than just short-term interventions. Finally, training teachers in a growth mindset to improve teacher learning management will contribute to long-term support in schools, as opposed to short-term interventions. This paper is a part of the doctoral dissertation entitled "Program of developing growth mindset for enhancing learning management of teachers in the primary schools under the office of the basic education commission (OBEC)".

2.   LITERATURE REVIEW
2.1. Concepts and theories related to a growth mindset

Carol Dweck, a psychologist, and researcher with expertise in social psychology, personality, and developmental psychology, has studied self-theory, a link between developmental psychology, social psychology, and personality psychology, and is interested in the perception or self-understanding that individuals use to create their identity (ego) and using this understanding and perception to lead to the expression of their behavior. From 1973 to 1982, she studied and researched methods for improving learned helplessness by focusing on various dimensions such as expectations, social cues, achievement motivation, evaluation feedback, and sex difference. In 1977, she became interested in studying motivation and achievement orientation. From 1993 to 1998, he studied implicit theories. In 1999, she developed and created a self-theory that includes the roles in motivation, personality, and self-development, focusing on how individuals develop beliefs about themselves and how the psychology of praise can adjust and change a person's thoughts, feelings, and behavior studying various theories to find out why some students are motivated to work harder, while others are in a state of hopeless learning. In 2006, she wrote the book entitled "Mindset: the new psychology of success", which has been accepted and applied in studies, business operations, sports, and others all over the world [2].

The growth mindset process, also known as the implicit theory, is defined as a core assumption about the sensitivity of personal qualities [14]–[17]. People with an incremental theory believe intelligence, personality, and abilities can grow or develop over time. People with an entity theory believe these basic human qualities are fixed and unchangeable [17], [18]. Those who believe intelligence is malleable (as opposed to an unchangeable, fixed entity) showed stronger learning goals and more positive beliefs about effort and engaged in strategies emphasizing more effort, such as working harder and spending more time on tasks [19]. When people set learning as a goal, they focus on the meaning behind what they have to learn and try to improve it for their benefit [20]. On the other hand, people with a fixed mindset focus on performance goals like being intelligent and proving one's abilities, while people with a growth mindset focus on learning goals like being intelligent and developing one's abilities [14], [21]. Students with a growth mindset are more resilient when faced with adversity [22]. Students with a growth mindset interpret human behavior in terms of context-sensitive psychological processes, while those with a fixed mindset focus on tacit characteristics and overlook situations as the underlying cause of behavior [16], [23]. Additionally, people with a fixed mindset tend to be stereotypic [24], [25]. The growth mindset process was studied and developed until it became widespread. Carol Dweck employed the growth mindset process to develop personnel in many circles, such as business or sports, as well as education. It is considered a key to success in learning and living in the future because a growth mindset is a person's belief that they can develop their potential in various fields with enough determination and effort. Furthermore, a growth mindset is not open-mindedness or flexibility in beliefs [26], [27].

In conclusion, regarding the origin of the growth mindset, it was discovered that the starting point of the study of the growth mindset began with a study to solve the problem of hopelessness in the learning of

students by trying to study the factors involved in many dimensions to be comprehensive until being able to understand the cause and relationship and discovering that what is important in human development is related to the growth mindset that believes that basic characteristic. Thus, to achieve the learning management objectives, learn from criticism and feedback while also seeking lessons and inspiration from others' successes.

2.2. Concepts and theories related to teacher development

Teacher development is a continuous process aimed at enhancing the professional competencies of teachers in various aspects, including knowledge, skills, attitudes, and their role in the educational community. Various concepts and theories have been proposed to explain and deepen our understanding of this process. One key idea is lifelong learning and CPD, which emphasizes that teachers should engage in ongoing learning to adapt to educational changes. This concept highlights experiential learning, self-reflection, and participation in professional learning communities [28]. Griffith *et al.* [29] concluded that teachers are important wisdom in developing students. Teachers must be a force multiplier in bringing children into the learning system. The teacher's role must change from telling knowledge to being someone who allows students to use the process to think and seek knowledge and solve problems on their own. Teachers must change their role from being teachers to facilitators and a person who prepares experiences and teaching media for students to study on their own. which is consistent with Mezirow [30] concept of transformative learning, which asserts that teachers can develop when they begin to question their existing assumptions, embrace new perspectives, and consequently change their teaching behaviors and attitudes. Similarly, Fuller and Bown [31] proposed a developmental model of teacher growth, suggesting that novice teachers initially focus on "survival" in the classroom. Over time, their focus shifts to managing the learning process and, ultimately, to considering their impact on student outcomes. This framework is helpful for providing stage-appropriate support to teachers throughout their development. This is consistent with Kolb [32], argued that teachers learn best through a cycle of concrete experience, reflective observation, conceptualization, and active experimentation. This learning cycle supports CPD. The more knowledge and understanding teachers have about teaching, the more alternatives they will have, making students always enthusiastic about learning. The 70:20:10 model for learning and development, which is currently in use, mainly focuses on learning and developing personnel in the organization. The ratio division is as follows: 70% is experimental (on-the-job) learning, 20% is mentoring and coaching, and 10% is formal educational events providing various knowledge from the development program [33]. In conclusion, these concepts and theories play a vital role in explaining the mechanisms and factors of teacher development, both at the individual and systemic levels. Their application can significantly enhance the overall quality of education and enable teachers to effectively meet the demands of the modern educational landscape.

Developing a growth mindset to improve teachers' learning management is critical for a variety of reasons. Teachers who believe that their abilities can be developed through effort and learning are more motivated to improve their teaching skills and methods to be more effective. Stimulating students' learning fosters belief in their ability to develop themselves, making them more motivated to learn and take on challenges. Creating an environment that encourages learning. By emphasizing development and effort rather than success or results, developing learning management, being open to constructive suggestions and ready to improve learning management approaches to better suit student needs, increasing flexibility in facing challenges and problems, enabling more creative and effective solutions to deal with various situations, inspiring teachers and confidence in teaching, and encouraging teachers to have positive thoughts about self-development. Developing a growth mindset in teachers is critical for promoting effective learning, positively impacting student development, and creating learning environments that support long-term growth.

2.3. Research framework

This study is a research and development (R&D) program to develop a growth mindset to enhance the learning management of primary school teachers. The scope of research is as follows: components of a growth mindset to enhance the learning management of teachers in primary schools, the researcher synthesized the program's components from documents and research related to the concepts. As a result, there are 6 components and 21 indicators [4], [5], [13], [34]–[40]. Program components the researcher synthesized program components from documents and research on academic concepts, as a result, there are 6 components [41]–[48]. Principles of learning and development 70:20:10 [33] include: i) 70% is learning from operational integration; ii) 20% is learning by working with others and learning from others; and iii) 10% is training or self-learning. Methods for teacher professional development the researcher synthesized teacher development methods based on relevant documents and research [49]–[51]. Methods for teacher development within the context of the OBEC, as shown in Figure 1.

This research conceptual framework is a research implementation framework designed to provide readers with a conceptual understanding of the overall picture of the research implementation on the

development of a growth mindset framework to improve teachers' facilitating learning, which is based on a synthesis of theoretical concepts, research, and related research. The growth mindset development program for elementary school teachers aims to enhance learning and personal development through training, mentoring, and sharing of knowledge among teachers, using the 70:20:10 knowledge development principle to enable teachers to effectively apply it in their classrooms. The program also emphasizes creating a culture of accepting failure and learning from others to promote growth in both teaching and student learning.
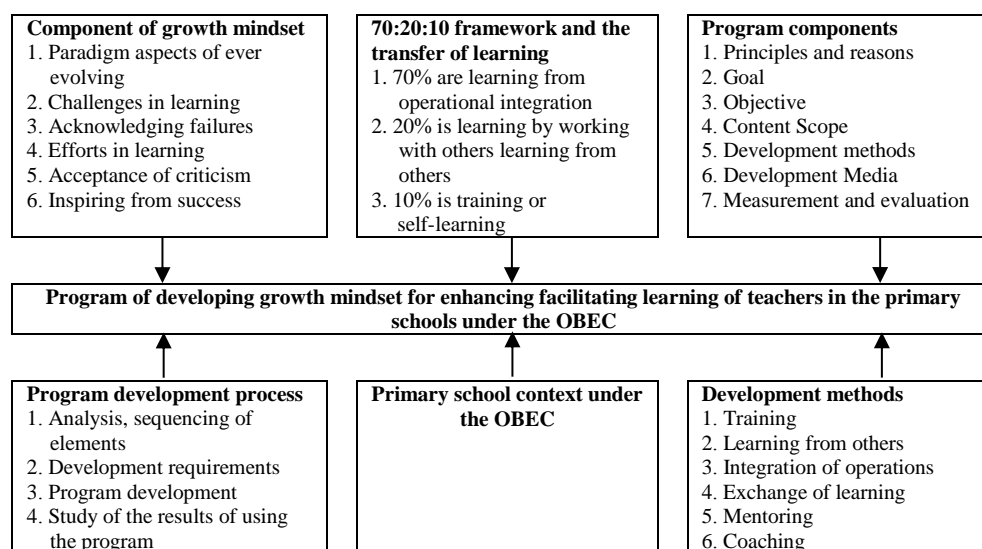

Component of growth mindset
1. Paradigm aspects of ever evolving
2. Challenges in learning
3. Acknowledging failures
4. Efforts in learning
5. Acceptance of criticism
6. Inspiring from success

70:20:10 framework and the transfer of learning
1. 70% are learning from operational integration
2. 20% is learning by working with others learning from others
3. 10% is training or self-learning

Program components
1. Principles and reasons
2. Goal
3. Objective
4. Content Scope
5. Development methods
6. Development Media
7. Measurement and evaluation

Program of developing growth mindset for enhancing facilitating learning of teachers in the primary schools under the OBEC

Program development process
1. Analysis, sequencing of elements
2. Development requirements
3. Program development
4. Study of the results of using the program

Primary school context under the OBEC

Development methods
1. Training
2. Learning from others
3. Integration of operations
4. Exchange of learning
5. Mentoring
6. Coaching

Figure 1. Research conceptual framework

3. METHOD

3.1. Research design
The researcher employed a mixed-mode approach, which consists of philosophical assumptions that guide data collection and analysis using a combination of qualitative and quantitative methods. The research process is divided into four phases: planning, searching, discovering, reflecting, synthesizing, revising, and learning. This method emphasizes the collection, analysis, and integration of quantitative and qualitative data within a single study. The main principle is to combine quantitative and qualitative methods to gain a more complete understanding of the research problem than either method alone.

3.2. Research samples and procedures
This research was conducted using R&D methodology and divided into 4 phases with the program development process involves analysis, organizing components, studying development requirements, creating and developing the program, and evaluating the program's effectiveness. The details are as follows:

3.2.1. Phase 1 studied the components and indicators
Step 1 was to study the components and indicators of a growth mindset to enhance learning management for primary school teachers. The researcher synthesized components and indicators from related concepts, theories, and research documents and evaluated their appropriateness by a group of 9 experts with expertise in the growth mindset selected by purposive sampling. The instrument used to collect data was a questionnaire to assess the appropriateness of the components and indicators of a growth mindset. It was sent to 9 experts to consider the validity and appropriateness of the questionnaire, and it was found to be accurate and appropriate for further data collection. The consistency of the growth mindset component model to enhance learning management for primary school teachers was examined. The consistency of the component model with a sample was examined by a group of 433 primary school teachers under the OBEC in semester 2 of the academic year 2021, which is also a sample group used in the confirmatory factor analysis (CFA) and were selected by multi-stage random sampling method. The minimum sample size was determined using Yamane's formula at a confidence level of 95%. The instrument used to collect data was a 5-level rating scale, one copy. Data were collected by submitting an online assessment, and the data was analyzed using means, standard deviations, and Pearson's correlation coefficients. As for the variable level, the development

of the growth mindset is a CFA using the Mplus program to check the consistency of the model with the empirical data.

3.2.2. Phase 2 studied the needs

To study the current condition, desired condition, needs, and a growth mindset development to enhance the learning management of primary school teachers, the sample was 427 primary school teachers under the OBEC, which was obtained through multi-stage random sampling. The minimum sample size was determined using Yamane's formula at a confidence level of 95%. The instrument used to collect data was a 5-level rating scale questionnaire to inquire about the current and desired conditions in developing a growth mindset collected through the mail and online. Statistics used in data analysis include mean, standard deviation, and modified priority needs index ($PNI_{Modified}$).

3.2.3. Phase 3 developed the program

To study best practices in developing a growth mindset to enhance learning management for primary school teachers, the group of informants consisted of 5 experts using a purposive selection method to select qualified teachers with best practices. This study has criteria for determining the qualifications of informants as follows: the experience in learning management and learning management according to the growth mindset according to the qualification criteria: the research instrument was a semi-structured interview form and used a structured interview recording form through which data were collected in the interviews. The researcher has appointed a group of informants to conduct interviews. In one school, informants were interviewed on all topics on the same day using notes, voice recorders, and video cameras. The interviews consisted of 6 main issues and 21 sub-issues using in-depth interviews, and then the data was analyzed using content analysis. The evaluation of the consistency of the development program; the study of the usefulness, suitability, and feasibility of the draft development program; and the results of the evaluation of the suitability of the development program manual were evaluated by the target group, which was the experts to examine the program consistency and the usefulness, suitability, and feasibility of the draft development program. The suitability of the program manual was examined using a connoisseurship seminar with ten people selected by purposive sampling according to the qualification criteria. The instrument used to collect data was a 5-level rating scale questionnaire, which was divided into three forms, including: i) the development program consistency assessment form; ii) the usefulness, suitability, and feasibility of using the program in real situations assessment form; and iii) the suitability of the development program manual assessment form. Five experts used the instruments to collect data and return the assessments in person and by mail. The data that were collected were analyzed using mean and standard deviation.

3.2.4. Phase 4 studied the results of using the program

The target group is 15 teachers who volunteer to receive development under the roiet primary education area office region 2. The instruments used to collect data include: i) a test of knowledge and understanding of the development program; ii) a semi-structured interview form; and iii) a behavioral observation form in development. The instrument was sent to 5 experts to consider the validity and appropriateness of the questionnaire, and it was found to be accurate and appropriate for data collection. The researcher collected data by conducting interviews in which one school interviewed all three groups on the same day. The data was analyzed using content analysis, mean, standard deviation, and z-statistic.

4. RESULTS AND DISCUSSION
4.1. Components and Indicators of growth mindset for enhancing facilitating learning of teachers

From the examination of the synthesis of the theoretical concepts and key components of the growth mindset for enhancing teachers' facilitating learning, namely: i) paradigm aspects of ever-changing; ii) challenges in learning; iii) acknowledging failure; iv) learning efforts; v) acceptance of criticism; and vi) inspiring success. The research results of the first phase indicated that there were 21 indicators of the growth mindset framework for enhancing teachers' facilitating learning, which was derived from 6 key components, as shown in Figure 2, as well as the recommendations of 9 experts on adjusting the components and indicators of the growth mindset framework for enhancing facilitating learning of teachers, totaling 21 indicators, to be consistent with the 6 components.

The results of the evaluation are appropriate at a high level because the researcher has studied, analyzed, and synthesized the concepts of the growth mindset theory from both domestic and international academics and related research to obtain the components and indicators of the growth mindset to enhance facilitating learning for primary school teachers. The evaluation results show that it is appropriate at the highest level. All components and indicators are consistent with the academics that the researcher had analyzed and

synthesized related theoretical and research documents, including the definition of a growth mindset to enhance the facilitating learning for primary school teachers, operational definitions, and indicators of each growth mindset component which is consistent with the study of Hattie [7] which found that there are six components: i) belief in intellectual potential; ii) acceptance of challenges; iii) facing defeat; iv) viewing that effort creates learning; v) learning from criticism; and vi) seeking lessons and inspiration from other people's successes, and consistent with the studies of [2], [51] states that beliefs about one's intelligence regarding challenges, facing obstacles, perspective on effort, being criticized, and the success of others are characteristic of love for challenging work. When facing obstacles, they acknowledge the importance of effort as creating expertise, learning from criticism, and seeking lessons and inspiration from others' successes, which aligns with Wilson [39] who stated about the growth mindset that believes that everyone can learn and that everything can happen and is possible with effort, determination, enthusiasm, and persistence in the face of problems and obstacles that arise. It is also the mindset of trying to complete challenging tasks and not being afraid of mistakes and failure, which is in line with studies by [2], [37], [52], [53].

Components	Indicators
1. Paradigm aspects of ever evolving	2.1) A self-belief that potential can be developed 2.2) An understanding of the mindset, beliefs, and perspectives towards oneself 2.3) A shift in one's perspective on growth thinking and positive attitudes 2.4) A positive communication with oneself and learners 2.5) A love of lifelong learning
2. Challenges in Learning	2.1) Exposure to challenges 2.2) Setting learning management goals 2.3) Courage to face problems and obstacles 2.4) Moving beyond comfort zones to thought growth area
3. Acknowledging failures	3.1) Accept and learn from mistakes 3.2) Be brave in the face of failure 3.3) Use the power of the word "yet" to manage learning
4. Efforts in learning	4.1) Dedication of time to learning management 4.2) Cultivating the effort and potential of the brain can be developed 4.3) Focusing on effort and process
5. Acceptance of criticism	5.1) Being open to criticism and listening to other people's opinions 5.2) Providing feedback in learning management 5.3) Providing constructive feedback in the learning management process
6. Inspiring from success	6.1) Being open to the achievements of others 6.2) Finding other people's achievements to inspire 6.3) Empowering learners with the opportunity to succeed in learning

Figure 2. Growth mindset for enhancing facilitating learning of teachers' indicators

4.2. Goodness-of-fit of the growth mindset for enhancing facilitating learning of teachers' indicators with the empirical data

In the second phase of this study, researchers aimed to obtain estimates of the parameters of the growth mindset for enhancing the facilitating learning of teachers' models, the factor loading, and the validity of the observable factors of the growth mindset for enhancing the facilitating learning of teachers. As indicated in Table 1, the factor loading of all the growth mindsets for enhancing facilitating learning of teachers' factors ranged from 0.924 to 0.988, statistically significant at 0.01. The factor loading refers to the importance of the standard indicators of each factor in the growth mindset for enhancing learning of teachers model primary schools that had been taken into consideration. The covariance with the growth mindset for enhancing learning of teachers' factors ranged from 85.40-95.70%. The factor with the highest factor loading was the acknowledging failures. This was followed by paradigm aspects of ever evolving, inspiring from success, efforts in learning and the challenges in learning. The factor that had the lowest factor loading was acceptance of criticism. As a result, all the key factors are found to be important constructs of a growth mindset for enhancing the learning management of teachers.

In structural equation modeling, the fit indices establish whether the model is acceptable overall. The result revealed that the growth mindset for facilitating learning management of teachers' model has a goodness of fit with the obtained data of, $\chi^2=33.927$ df=41, $\chi^2/\mathrm{df}=0.827$, p-value=0.7753, comparative fit index (CFI)=1,000, Tucker-Lewis index (TLI)=1.005, root mean square error of approximation

(RMSEA)=0.000, and standardized root mean square residual (SRMR)=0.036. The relative Chi-square is also called the normed Chi-square. This value equals the Chi-square index divided by the degrees of freedom (χ^2/df). The criterion for acceptance varies across researchers, ranging from less than 2 [54] to less than 5 [55]. SRMR values (0.036) lower than 0.05 indicate well-fitting models [56], [57]. A value of the CFI of 1,000 Diamantopoulos and Siguaw [57] is recognized as indicative of a good fit. A cut-off point of 0.95 has been recommended for the goodness-of-fit index (GFI) [58]. Values of 0.90 or greater indicate well-fitting models for the adjust goodness of fit index (AGFI) [59]. Besides, Hu and Bentler [60] recommended norm fit index (NFI) and TLI values of 0.95 or higher. Recently, a cut-off value for RMSEA close to 0.06 [58] or a stringent upper limit of 0.07 [61] is recommended. Although the chi-square is the standard statistic to assess the overall fit of the model to the data, it is practically impossible not to reject the null hypothesis when large samples are used [62]. Finally, it was found that the growth mindset for enhancing learning management of teachers' model agreed with the empirical data. As a result, the model was accepted, and researchers could establish whether specific paths were significant as illustrated in Figure 3.

Table 1. Factor loading of growth mindset for enhance facilitating learning of teachers' factors

| Factors	Factor loading (β)	Prediction coefficient (R^2)	Error (e)
Acknowledging failures	0.988 (0.103)	0.977	0.023
Paradigm aspects of ever evolving	0.982 (0.033)	0.964	0.036
Inspiring from success	0.979 (0.032)	0.959	0.935
Efforts in learning	0.978 (0.021)	0.957	0.925
Challenges in learning	0.965 (0.025)	0.964	0.069
Acceptance of criticism	0.924 (0.035)	0.854	0.146
Results: χ^2=33.927, df=41, χ^2/df=0.827, p-value=0.7753, CFI=1,000, TLI=1.005, RMSEA=0.000, SRMR=0.036			

Note: n=433
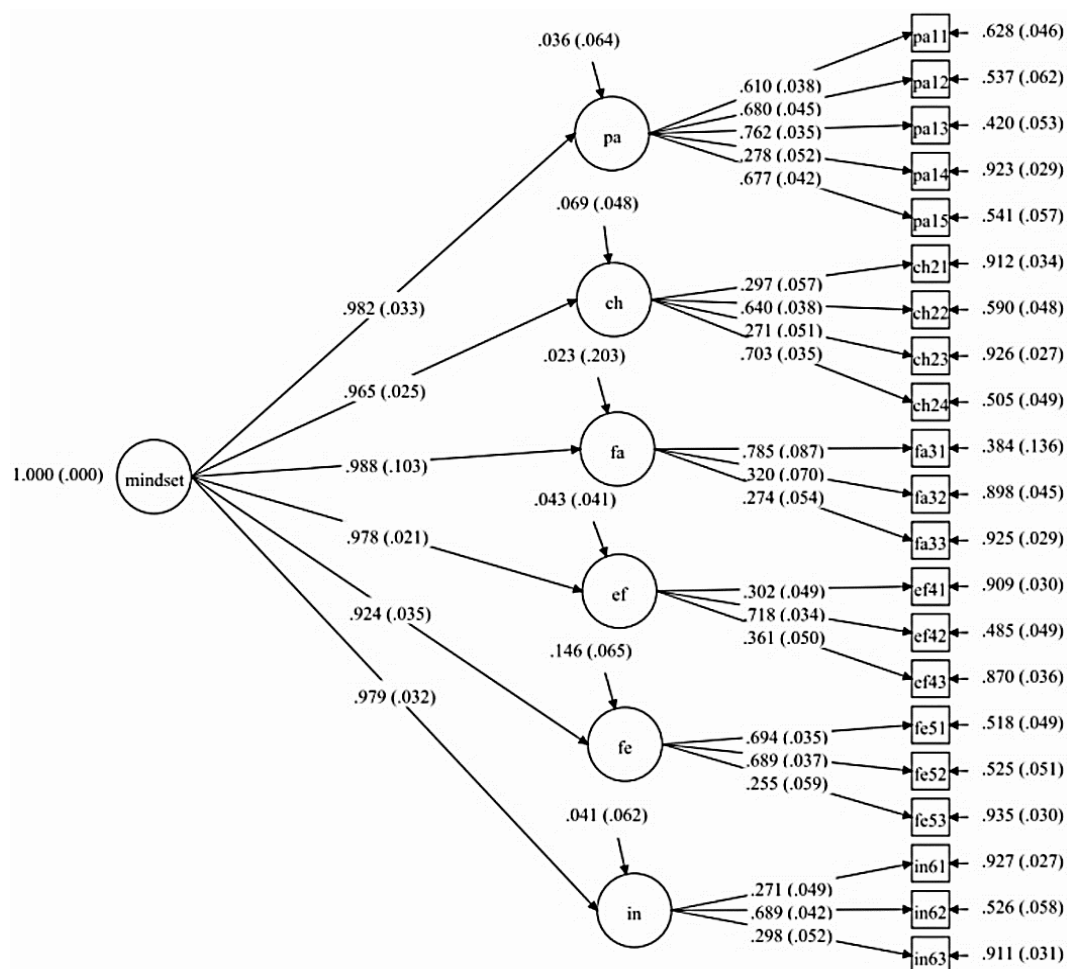
Figure 3. Growth mindset for enhancing facilitating learning of teachers in the primary schools model

4.3. Needs assessment

The results of the study of the conditions and needs of the growth mindset development to enhance the learning management of primary school teachers. The essential need to develop a growth mindset to enhance the learning management of primary school teachers is at the level of need for development ($PNI_{modified}$=0.414) when prioritizing the need for development based on $PNI_{modified}$. The most common development needs are the acceptance of criticism ($PNI_{modified}$=0.453), followed by the acknowledgment of failures ($PNI_{modified}$=0.439), efforts in learning ($PNI_{modified}$=0.423), challenges in learning ($PNI_{modified}$=0.421), paradigm aspects of ever-evolving ($PNI_{modified}$=0.418), and inspiring from success ($PNI_{modified}$=0.329), respectively. The results of the analysis are shown in Table 2.

Table 2. The results of the needs assessment on developing a growth mindset to enhance the learning management of primary school teachers

Component	Degree of success (D)		Important (I)		$PNI_{modified}$ (I-D/D)	Order of importance
	X	Interpret the results	$\overline{X}$	Interpret the results		
1. Paradigm aspects of ever evolving	3.11	Moderate	4.41	High	0.418	5
2. Learning management challenges	3.16	Moderate	4.49	High	0.421	4
3. Acknowledging failures	3.10	Moderate	4.46	High	0.439	2
4. Efforts to manage learning	3.13	Moderate	4.45	High	0.425	3
5. Acceptance of criticism	3.07	Moderate	4.46	High	0.453	1
6. Inspiring others' success	3.23	Moderate	4.29	High	0.329	6
Overview	3.13	Moderate	4.43	High	0.414	

Note: n=427

The study of needs can provide valuable insights for creation and development. It will reveal the current situation, desired conditions, requirements, priorities, and program creation and development. It will assist researchers in creating representative samples of the population, developing tools for collecting quality data by academic principles, and designing correct and appropriate data analysis. It may provide useful information for program creation and development in the subsequent phase.

The study of the current conditions and desired conditions of developing a growth mindset to enhance facilitating learning for primary school teachers, the overall high level, and the overall desired conditions at the highest level. The aspect with the highest score of developmental needs is the effort in learning. The research results found that the current condition of the growth mindset development to enhance facilitating learning of teachers in all aspects is at a moderate level. It points out that administrators and agencies are not promoting growth mindset development to enhance the learning management of primary school teachers as much as they should. Regarding the needs analysis results in the growth mindset development to enhance facilitating learning of teacher of primary school using $PNI_{modified}$, it was found that the acceptance of criticism has the highest needs ($PNI_{modified}$=0.453). The research results show that the more people accept criticism, the more likely they will succeed in the long term. Such finding is consistent with the results of the need for developing a growth mindset of teachers in a study by Knight [51], which found that a growth mindset with high needs that should be accelerated to develop are these four aspects including: i) not giving up in the face of obstacles; ii) enjoying challenges; iii) seeking inspiration from others' successes; and iv) learning from criticism. This is consistent with Dweck [2], who developed the concept of a growth mindset from implicit theories showing the importance and influence of mindset on human behavior and success: people who do not give up easily have the power to recover from failure and can persevere through obstacles and put in hard effort until they succeed in various matters. Therefore, if school administrators or agencies want to develop teachers' growth mindsets, they should consider effort in learning first. In addition, it was found that there should be a paradigm for developing challenges in learning, failure acceptance, being open to accept criticism in learning management, and inspiring by success should be developed because there is a high need ($PNI_{modified}$ not less than 0.32) which is consistent with Dweck [3], Chan [63], and O'Rourke et al. [64] stated that such characteristics are important characteristics of people with a growth mindset.

The development of a growth mindset in Thai teachers is still not fully recognized. Most teachers may have a limited understanding of this concept or still believe in a fixed mindset. Using the problem to develop a growth mindset development program for teachers through development or training related to growth mindset may be limited or may not cover all schools, particularly in rural areas or schools with limited resources. Some teachers may lack the necessary knowledge and skills to implement a growth mindset in the classroom, particularly when it comes to motivating and managing students' learning challenges. Furthermore, a lack of support from school administrators or resources to develop a growth mindset may impede its actual implementation.

4.4. Development of a growth mindset for enhance facilitating learning of teachers

We designed a growth mindset for enhancing the learning management of teachers in primary schools; the development program, as shown in Figure 4, has the results of the suitability assessment. It is classified into 4 phases based on the 70:20:10 model for learning and development, 120 hours total [33]. The development phase consists of phase 1, 12 hours of workshops in 6 modules with pre-development assessment through registration and knowledge testing, intensive training, phases 2 and 3, 4 weeks of on the job integration through learning activities, 84 hours of self-directed learning, 3 weeks of learning community building with 18 hours of coaching and mentoring, and 6 hours of post-development assessment.
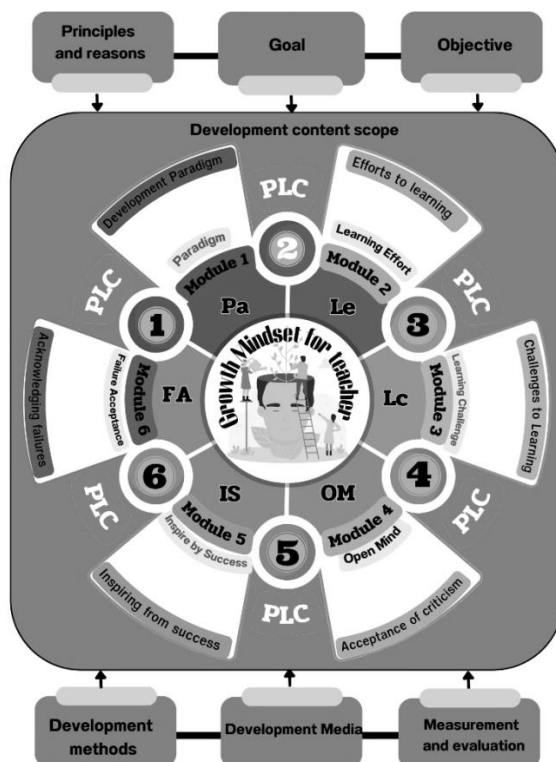
Figure 4. Program of developing growth mindset for enhancing facilitating learning of teachers

There are seven components for developing the growth mindset development to enhance facilitating learning of teachers, namely: i) principles and reasons; ii) goals; iii) objectives; iv) content scope; v) development methods; vi) development media; and vii) measurement and evaluation. There are six modules for developing the growth mindset to enhance learning management, namely: i) development paradigm; ii) effort in learning; iii) challenges in learning; iv) acceptance of criticism; v) inspiring by success; and vi) failure acceptance. They are appropriate at a high level, probably because the researchers had studied the principles and concepts from textbooks of academics who synthesize program components, which is consistent with the program components, program development, and methods for developing a growth mindset to enhance teachers' facilitating learning for implementing in the program for growth mindset development to enhance teachers' facilitating learning in the studies of Houle [42] and Knowles [65]. This is consistent with the studies of Johnsson and Johnson [66] and Chatchawaphun et al. [67], which stated that program development is the creation of a plausible model of how the program is expected to function to produce desired results.

The development program and program instruction manual were assessed by ten experts for their suitability in developing a growth mindset to improve the learning of all ten elementary school teachers. The experts provided very positive feedback, rating the developed program criteria as highly appropriate, feasible, and useful. Tables 3 and 4 displays the evaluation results for the ten experts.

Table 4 shows that the development program developed has the highest overall expert assessment level. When considered individually, it was found that there was the highest level of consistency in the development program. The usefulness of the development program, the appropriateness of the development

program, and the feasibility of the development program are at the highest level, and the appropriateness of the development program manual is at the highest level.

Teachers must use a continuous growth mindset development program to improve their understanding of growth mindset and their ability to apply the method to classroom learning management to develop their students' learning. It is critical to receive support from school administrators in promoting a growth mindset in teachers, such as teacher training, learning from others, embedding in practices that emphasize growth mindset development, and establishing professional learning communities, which are learning networks where teachers can share experiences and best practices in using a growth mindset in facilitating learning for students.

Table 3. Usefulness suitability and possibility assessment

Contents	Usefulness			Suitability			Possibility		
	$\overline{X}$	S.D	Meaning	$\overline{X}$	S.D	Meaning	$\overline{X}$	S.D	Meaning
1. Principles of the program and problems and needs	4.60	0.52	Highest	4.40	0.52	High	4.60	0.52	Highest
2. Program objectives	4.50	0.53	High	4.50	0.53	High	4.50	0.53	High
3. Program goals	4.40	0.52	High	4.60	0.52	Highest	4.50	0.53	High
4. Program duration	4.60	0.52	Highest	4.40	0.52	High	4.80	0.42	Highest
5. Program development content	4.70	0.48	Highest	4.30	0.48	High	4.70	0.67	Highest
6. Program development methods	4.50	0.53	High	4.50	0.53	High	4.20	0.92	High
7. Media/learning resources for training and development	4.70	0.48	Highest	4.30	0.48	High	4.70	0.48	Highest
8. Overview of the development program	4.60	0.52	Highest	4.40	0.52	High	4.80	0.42	Highest
Overview	4.59	0.53	Highest	4.70	0.48	Highest	4.60	0.52	Highest

Note: n=10

Table 4. Result summary of the program evaluation and the program implementation manual for the growth mindset development to enhance facilitating learning of teachers from experts

Item	$\bar{x}$	S.D.	Result
1. Consistency of the development program	4.48	0.56	High
2. Benefits of the development program	4.59	0.53	Highest
3. Suitability of the development program	4.70	0.48	Highest
4. Possibility of implementing the development program in real-life situations	4.60	0.52	Highest
5. Appropriateness of the development program manual	4.56	0.64	Highest
Overall	4.57	0.55	Highest

Note: n=10

4.5. The results of using the program

The researcher used the program to develop a growth mindset framework to improve the facilitating learning of teachers to develop 15 volunteer teachers in the network center 15, Chi River Basin, between July 20, 2023, and August 20, 2023, by developing a 6-module program divided into a 12-hour workshop, 24-hour learning from others, and 84-hour integration in practice, totaling 120 hours. The outcomes of developing a growth mindset to improve the facilitating learning of primary school teachers were measured and evaluated. Table 5 shows the results of comparing scores before and after developing a growth mindset to improve primary school teachers' facilitating learning.

The results of comparing the knowledge and understanding of the mindset before and after participating in the development of the growth mindset to enhance the facilitating learning of primary school teachers found that the mean score ($\overline{X}$) of a mindset before participating in the development program was 43.33, and the after participating in the development program was 48.80, with a z-statistic value of 3.20 and a sig. value of 0.00. It shows that the teachers who received the development had a higher growth mindset score after the development than before the development with statistical significance at the 0.01 level, and able to organize activities after integration into their work.

The program for developing a growth mindset to improve facilitating learning of primary school teachers is an activity for developing knowledge and understanding and enabling recipients to have a growth mindset that can be put into practice. The development activities follow appropriate steps and can help recipients gain knowledge and a growth mindset to improve facilitating learning. The activity planning process is interesting, enjoyable, and not tedious. The instructors are approachable, allowing the recipients to ask questions, exchange knowledge, and offer advice, encouraging them to think and practice. The instructors' knowledge transfer techniques can make difficult concepts simple to understand, allowing recipients to grasp the growth mindset and improve facilitating learning even further.

Table 5. Compares the mindset scores before and after the development

No.	Pre-development score	Post-development score
1	44	50
2	45	49
3	42	48
4	45	49
5	44	47
6	39	48
7	46	46
8	47	47
9	43	50
10	44	50
11	44	49
12	40	50
13	44	50
14	43	49
15	40	50
Sum	650	732
$\bar{X}$	43.33	48.80
S.D.	2.26	1.32
Z	3.20	
Sig	0.00**	

**statistical significance at the 0.01

The characteristics of teachers who exhibit certain behaviors have a direct influence and impact on students, whether positive or negative. As a result, the characteristics of teachers with a growth mindset will influence how learners develop a growth mindset. This is because teachers' growth mindsets influence their learning management behaviors, which in turn influence the learning experiences that their students receive. As a result, teachers must constantly learn and develop to be growth-oriented individuals. This is because students who study with teachers who have honed their skills in developing a growth mindset outperform those who do not.

A study of the implementation of the program to develop a growth mindset to strengthen the facilitating learning of primary school teachers found that the mean test score after using the growth mindset development program of teachers who volunteered to participate is higher than the mean test score of before using the program to enhance the facilitating learning for primary school teachers with a statistically significant level at the 0.01. The results of participating in the development of teachers who volunteered to receive the development revealed that they could manage overall learning after the development at the highest level, which is consistent with [2], [13], [68] stated that students should feel that the teacher value the learning process and risks rather than just the achievement of the result.

5. CONCLUSION

Developing a growth mindset in teachers is likely to result in more effective learning management, with students having positive attitudes toward learning and being better prepared to face challenges. Continuing R&D should focus on improving training methods and supporting teachers so that they can apply a growth mindset on a larger scale, as well as developing accurate measurement tools to effectively assess outcomes. Studying and developing a growth mindset in Thai teachers will help to improve the long-term effectiveness of learning management and educational quality. Students are directly influenced by their teacher's traits, whether favorable or negative. Teachers that have a growth mindset help their pupils develop a growth mindset as well. A teacher's growth mindset influences their behavior in managing learning, which influences the learning experiences students receive. To sustain a growth mentality, teachers must continue to learn and develop themselves. The growth mindset development program, which aimed to improve teachers' learning management, helped teachers understand and transition from a fixed mindset to a growth mindset. This moves enabled teachers to continuously alter their teaching strategies to focus on developing students' learning processes. Teachers who participated in this program felt that abilities could be developed, encountered obstacles in managing learning, and provided more praise and constructive comments to students, emphasizing their processes and efforts. This led to increased student learning results. Furthermore, the program improved teachers' communication and classroom management skills, making learning management more effective.

AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization	I : **I**nvestigation	Vi : **Vi**sualization
M : **M**ethodology	R : **R**esources	Su : **Su**pervision
So : **So**ftware	D : **D**ata Curation	P : **P**roject administration
Va : **Va**lidation	O : Writing - **O**riginal Draft	Fu : **Fu**nding acquisition
Fo : **Fo**rmal analysis	E : Writing - Review & **E**diting	

CONFLICT OF INTEREST STATEMENT

All authors declare that we have no conflicts of interest.

INFORMED CONSENT

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee. This research proposal has been considered and approved by the Human Research Ethics Committee, Mahasarakham University, certification number 151-163/2565, and ethical approval has been given to conduct the above research study based on the research outline of the Human Research Ethics Committee.

DATA AVAILABILITY

The data that support the findings of this study will be available in [http://202.28.34.124/dspace/] [http://202.28.34.124/dspace/handle123456789/2534] following a [6 month] embargo from the date of publication to allow for the commercialization of research findings.

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