

Developing Guidelines for the Production and Professional Development System of Early Childhood Teachers in Thailand: A Research Synthesis Study

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Abstract

Early childhood teachers, child caregivers, and assistant teachers play a crucial role in promoting the holistic development of young children. However, the system for producing and professionally developing these personnel in Thailand remains fragmented and requires systematic improvement. This study aimed to (1) synthesize research findings from three institutions producing early childhood teachers in Thailand and (2) develop guidelines for improving the production and professional development system. A qualitative research design was employed. Data was collected through documentary analysis of research reports, in-depth interviews with six key informants, and a focus-group discussion with eleven experts. The data were analyzed using content analysis. The findings identified three key factors and thirty-two guidelines for the teacher production system, including production goals, production patterns, and system management. For the teacher development system, four factors and forty-one guidelines were identified, including development goals, responsible agencies, development approaches, and system administration. The results highlight the need for coordinated implementation across national, regional, and institutional levels. The study provides policy-relevant guidelines for strengthening the system of producing and developing early childhood teachers in Thailand.

Keywords: *Production System, Development System, Professional Development, Early Childhood Education, Educational Policy*

1. Introduction

Early childhood is widely recognized as a critical period for human development, with long-term impacts on cognitive, social, and emotional outcomes. Investment in early childhood education generates substantial social and economic returns by enhancing human capital and reducing inequality (Kongsanoh, 2015). As a result, many countries have prioritized the development of qualified early childhood educators to ensure high-quality learning experiences for young children.

In Thailand, early childhood development has been emphasized through national policies such as the early childhood development plan (2021–2027) (Office of the Education Council, 2021) and the early childhood development act (2019). These policies highlight the importance of producing and developing competent early childhood teachers,

child caregivers, and assistant teachers who can support children's holistic development across physical, cognitive, emotional, and social domains. Early childhood educators play a crucial role in facilitating children's learning and development. To perform this role effectively, they require not only appropriate qualifications but also continuous professional development. Previous studies have emphasized the importance of professional learning systems, mentoring, and collaborative practices in enhancing teacher competencies (Sheridan et al., 2009). In addition, international frameworks such as those proposed by the National Association for the Education of Young Children (NAEYC) highlight the need for competency-based teacher education and ongoing professional development.

In addition, recent educational policy updates in Thailand have emphasized competency-based teacher development, lifelong learning, digital learning systems, and educational equity to improve learning opportunities for all children (Office of the Education Council, 2025). Current reforms, including the Credit Bank system and the Thailand Zero Dropout initiative, also highlight the importance of reskilling and upskilling early childhood teachers and child caregivers across diverse local contexts (Equitable Education Fund, 2025; OECD, 2025). These policy directions reinforce the need for integrated systems supporting the preparation and continuous professional development of early childhood educators in Thailand.

However, research on early childhood teacher production and development in Thailand remains fragmented. Existing studies have largely focused on individual programs, institutional practices, or specific local contexts. Few studies have synthesized findings across multiple institutions to generate system-level recommendations for improving the production and professional development of early childhood teachers. To address this gap, the Equitable Education Fund (EEF) supported three universities to conduct research on early childhood teacher production and development in different contexts. While these studies provide valuable insights, a comprehensive synthesis of their findings is needed to identify key factors and develop coherent guidelines for system-level reform.

Therefore, this study aims to synthesize research findings from three institutions producing early childhood teachers in Thailand and to develop guidelines for improving the production and professional development system of early childhood teachers, child caregivers, and assistant teachers.

2. Research Objectives

2.1 To synthesize research findings from studies conducted by three institutions producing early childhood teachers in Thailand in order to formulate recommendations for reforming the system of production and professional development of early childhood teachers, child caregivers, and assistant teachers.

2.2 To propose guidelines for the production and professional development of early childhood teachers, child caregivers, and assistant teachers.

3. Research Questions

3.1 What insights can be synthesized from research reports of three institutions producing early childhood teachers in Thailand regarding the system for the production and professional development of early childhood teachers, child caregivers, and assistant teachers?

3.2 What guidelines can be developed to improve the production and professional development system of early childhood teachers, child caregivers, and assistant teachers?

4. Literature Review

4.1 Professional Development for Early Childhood Education

Professional development in early childhood education refers to processes that enhance the knowledge, skills, and competencies of educators working with young children and their families. Effective professional development contributes to improved teaching practices and supports children's cognitive, social, and emotional development (Harvard Family Research Project, 2006).

Early approaches to professional development emphasized external sources of knowledge, such as training, lectures, and expert consultation. This perspective, often referred to as the "outside-in" approach, assumes that teachers develop professionally through knowledge transmission from experts. However, more recent perspectives highlight the importance of the "inside-out" approach, in which teachers actively engage in reflective practice, continuous learning, and collaborative knowledge construction (Helm, 2007; Wesley & Buisse, 2006).

4.2 Factors Influencing Professional Development

Sheridan et al. (2009) presented factors related to professional teacher development and concluded them into 4 aspects, 1) Process aspect, which can be carried out in various approaches such as mentoring, giving advices, and training, depending on whom that need such process, and consideration on assessment of knowledge, skill, need of development, and also timeframe of activities for achieving the target, and 2) Person aspect, which include within-person, between-person relationship, teacher's internal characteristic, which can be either opinion to themselves and their role as teachers, their opinion on quality of academic institution, beliefs on children learning, and attitudes towards their job. These factors are important for teachers' readiness and willingness for changes. Meanwhile, the ability to create positive relationship between teacher and mentor or advisor is another important factor for the success of the professional development process, 3) Context and System aspect, of which the early childhood education with various contexts and working culture of each context, and 4) Promotion of Sustainable Changes aspect, in which creation of the atmosphere for working environment is another factor that is very important for quality of early childhood management. Furthermore, passion of learning, as both individual and organization level, and CoP pattern is another type of professional development that aims for sustainable changes from within organization or own network, as well as development of organizational competency that can promote the sustainable culture of professional development for ongoing routine works (Wenger, 1998).

4.3 Professional Standards for Early Childhood Teachers

International frameworks emphasize the competencies required for early childhood educators. Organizations such as the National Association for the Education of Young Children or NAEYC (2020), the National Board for Professional Teaching Standards (2016), and Australian Professional Standards for Teachers (AITSL, 2018) highlight key domains of teacher competence.

These competencies can be broadly categorized into three areas:

1) The aspect of knowledge based on principles of early childhood education management. That is, early childhood teachers should be persons who have knowledge and understanding of holistic development and learning of children in their early childhood. Also, they should be able to integrate academic knowledge and properly select methods for transferring knowledge to early childhood children through various teaching techniques or play-based approach.

2) The aspect of working for early childhood development. That is, early childhood teachers should be able to work participatively with families, parents/caretakers, and communities for early childhood development. They should also be able to create safe environment for promoting early childhood development and learning, plan effective arrangement for early childhood learning, evaluate, reflect on information, and report results of early childhood learning.

3) The aspect of self-conduct for early childhood professionals. That is, early childhood teachers should show their professionalism by performing as early childhood educators, participating in professional activities, and learning continuously for professional self-growth.

These frameworks underline the importance of competency-based teacher education and ongoing professional development system.

4.4 Research Gap

Although several studies have examined early childhood teacher development in Thailand, most have focused on specific programs, institutional practices, or localized contexts. There is limited research that synthesizes findings across multiple institutions to develop system-level recommendations for improving both teacher production and professional development. Therefore, this study addresses this gap by synthesizing research findings from three institutions supported by the Equitable Education Fund (EEF) to develop comprehensive guidelines for strengthening the production and professional development system of early childhood teachers in Thailand.

5. Research Methodology

5.1 Research Design

This study employed a qualitative research design using research synthesis and expert consultation to develop guidelines for improving the production and professional development system of early childhood teachers, child caregivers, and assistant teachers in Thailand.

5.2 Data Sources and Participants

Data were collected from three main sources.

1) Documentary analysis

Research reports from three institutions funded by the Equitable Education Fund (EEF) in 2020 were analyzed to synthesize key findings related to the production and development of early childhood teachers.

2) In-depth interviews

Six key informants (two representatives from each institution) were purposively selected based on their involvement in designing and implementing the research projects. The interviews aimed to explore conceptual approaches and practical experiences related to teacher production and development system.

3) Focus-group discussion

A focus-group discussion was conducted with eleven experts selected based on their expertise and experience in early childhood education and educational policy. The participants included five academics, five administrators representing employers of early childhood teachers, and one policy-level expert.

5.3 Research Instruments

Three research instruments were used:

1) Document synthesis form, used to extract key themes related to teacher production and development system

2) Semi-structured interview protocol, designed to explore institutional approaches and experiences

3) Focus-group discussion guide, used to validate and refine the proposed guidelines

All instruments were reviewed by three experts in early childhood education, curriculum development, and educational research to ensure content validity. It was found that every question has the Index of Item – Objective Congruence (IOC) of 1.00. As such, the research team adjusted the questions for better clarity and more coverage of interview objectives before actual use.

5.4 Data Analysis

The qualitative data were analyzed using content analysis. The analysis process involved three steps:

1) Open coding to identify key concepts from documents and interview data

2) Categorization of codes into themes and sub-themes

3) Synthesis of themes to develop key factors and operational guidelines

To enhance the credibility of the findings, data triangulation was employed by comparing results from documents, interviews, and expert discussions.

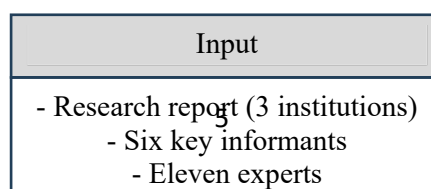


Figure 1: Conceptual framework for the development of early childhood teacher production and professional development system

6. Results

6.1 Synthesis of Teacher Production and Development System

The synthesis of research findings from three institutions revealed two major systems related to early childhood teacher policy: the teacher production system and the teacher development system. For the teacher production system, three key factors were identified: (1) specification of production goals, (2) patterns of teacher production, and (3) administration of the teacher production system. For the teacher development system, four key factors were identified: (1) specification of development goals, (2) responsible agencies for teacher development, (3) approaches for teacher development, and (4) administration of the teacher development system.

6.1.1 Teacher Production System

The findings indicate that the teacher production system is characterized by three interrelated dimensions. First, production goals emphasize competency-based outcomes aligned with professional standards for early childhood teachers, including knowledge, professional practice, and ethical conduct. Second, patterns of teacher production reflect three major approaches: (1) outcome-oriented production focusing on core competencies, (2) area-based production emphasizing decentralization and community participation, and (3) practice-based production emphasizing experiential learning. Third, administration of the production system includes mechanisms for student selection, curriculum design, professional experience training, and assessment. These components highlight the importance of aligning teacher preparation with real-world contexts and professional requirements.

6.1.2 Teacher Development System

The teacher development system consists of four key dimensions. First, development goals emphasize competency-based development, including both general and specific competencies aligned with professional standards. Second, responsible agencies operate at multiple levels, including national, regional, and institutional levels, reflecting the need for coordinated governance. Third, development approaches include training programs, mentoring systems, and professional learning communities (PLC), which support continuous professional growth. Finally, administration of the development system involves systematic processes for teacher selection, curriculum design, and evaluation, with an emphasis on continuous improvement and data-informed decision-making.

6.2 Operational Guidelines

Based on expert validation, a set of operational guidelines was developed for both the teacher production system and the teacher development system. The guidelines are organized according to key factors and responsible agencies, as presented in Tables 1 and 2.

Table 1: Factors and Operating Guidelines of the “Production System”

Factors	level agencies	Operational Guidelines
1. Specification of Teacher Production Goals	Policy	1) Support specification of professional standards which has specific characteristics, resulted from studies of requirements of the area, community, and users of graduated early childhood teachers
		2) Prepare a database and trend of required number of early childhood teachers and specify the curriculum as the “closed system”
		3) Establish cooperation with the teacher production institutes in the area, link the transition from production of child caregivers to early childhood teachers, and develop early

Factors	level agencies	Operational Guidelines
		childhood teachers who graduated from other fields of study.
	Teacher Production Institutes	<p>4) Prepare a curriculum for professional childhood teachers with integration of multidisciplinary and competency-based profession.</p> <p>5) Prepare a curriculum for development of “child caregivers”, who graduated from the lower level than bachelor degree, in the credit bank pattern in order to link child caregiving together with early childhood teachers and assistant teachers more effectively.</p>
2. Designing the pattern of Teacher Production System	Dimension 1: Structure and curriculum arrangement	
	Policy	1) Coordinate with relevant agencies to jointly evaluate or give critical comments on the curriculum to enable the early childhood teacher graduates to truly respond to the requirements of graduate users.
	Area	2) Coordinate with relevant agencies to jointly provide important information as a foundation for development of the teacher production curriculum corresponding to contexts in the area.
	Teacher Production Institutes	<p>3) Specify the curriculum structure with individual subjects and patterns of learning activity arrangement, in both normal manner and credit bank, to provide equal opportunity for education.</p> <p>4) Establish a system for curriculum evaluation and quality assurance that allows relevant agencies to participate in following-up and evaluation of the curriculum’s operation.</p>
	Dimension 2: Designing the curriculum with focused points	

Factors	level agencies	Operational Guidelines
	Policy-Area	<p>1) Implement requirements of the area and community for designing the curriculum and learning activities.</p> <p>2) Promote the learning culture and conscious mind responsible for education arrangement by opening spaces for joint development and promoting participation from all sectors.</p> <p>3) Create a system for Knowledge Management (KM) and promote Professional Learning Community (PLC), both intra-school PLC and inter-school PLC, to implement the information for the development of the teacher production curriculum.</p>
	Teacher Production Institutes	<p>1) Specify the essential competencies for early childhood teachers.</p> <p>2) Providing research funds for learning/teaching development.</p> <p>3) Design modular curriculum as options for students and group them based on essential competencies for early childhood teachers and levels of essential competency development.</p> <p>4) Create learning experiences that application of theories to practices or learning from simulating situation and then applying to actual situation.</p> <p>5) Use “work coaching with mentoring system” by teachers and mentors experienced from direct working experience with early childhood children.</p> <p>6) Create cooperation with academic institutions in the area as networks for professional experience training</p>

Dimension 1: Selection of enrolled students

Factors	level agencies	Operational Guidelines	
3. Administration of Teacher Production System	Teacher Production Institutes	1) Arrange activities to provide guidelines for future professions to high-school students so that they can learn about important duties and roles of early childhood teachers and gain inspiration.	
		2) Develop a selection system by using various tools and methods for selection	
		Dimension 2: Design of learning activities in each subject	
		1) Design structure for each subject in the curriculum that links the body of knowledge from various sciences.	
		2) Use Active Learning together with Assessment as Learning (AAL) to the information for teachers to conduct the Assessment for Learning (AFL)	
Dimension 3: Design of training for professional experience			
Teacher Production Institutes		1) Collect information related to professional experience training in the aspects of problems and various dimensions of operation to improve for better effectiveness.	
		2) Allow teacher students to gain community-based professional experience, child development centers, or childcare places in each province.	
Dimension 4: Design of measurement and evaluation			
Teacher Production Institutes		1) Use various patterns of competency evaluation which evaluation and reflection on practice, both in simulated and actual situations.	
		2) Use evaluation for following up progress or development and reflect result of the evaluation in order to enable students to continuously improve and develop themselves.	
		3) Follow up the results of teacher production system, especially in the first 2 years after graduation, to reflect information to the early childhood curriculum, which will be used for further design of the early childhood teacher's	

Factors	level agencies	Operational Guidelines
		development curriculum, both reskill and upskill.

Table 2: Factors and Operating Guidelines for the “Development System”

Factors	level agencies	Operational Guidelines
1. Specification of Teacher Development Goals	Policy	1) Specify direction for short-term and long-term development with consideration of different founding knowledge, professional experiences, and requirements of teacher development.
		2) Communicate and dissipate important body of knowledge essential for widely promoting early childhood development.
		3) Promote preparation of bilateral curriculum between academic institutions and teacher production institute in the manner of credit bank for development of child caregivers who have qualifications lower than bachelor’s degree.
		4) Plan to conduct workshop for specifying goals of teacher development in each year, specifying “specific area-based competency”, and specifying roles of relevant bodies to reduce repetitive operations.
		5) Provide a budget for the development of early childhood teachers and distribute it to academic institutions within the area to dynamically develop themselves.
2. Specification of main bodies responsible for the development	Important mechanisms of “early childhood teachers, child caregivers, and assistant teachers” must have inspiration to continuously develop for Self-Growth	
	Policy	1) Integrate teamworking between agencies with role in development of early childhood teachers from various affiliations and increase number of people suitable for scope of work.

Factors	level agencies	Operational Guidelines
		<p>2) Specify guidelines for following up results in accordance with quality and standard of important competencies.</p>
		<p>3) Specify standard of qualifications and criteria for selection of institution for early childhood education and child development centre with “best practice for early childhood” in the area, in connection with criteria of sources for professional experience training.</p>
		<p>4) Provide research funds to academics, researchers, teacher production institutes or other agencies, and create a system for knowledge collection and dissemination.</p>
	Area	<p>1) Cooperate with teachers production institutes in the area, affiliations of early childhood teachers, child caregivers, and assistant teachers, and academic institutions in the area, to analyze requirements for creating an integrated plan for area-based development, specify role of each agency, and create the active working culture.</p>
		<p>2) Select academic institutions with best practice for early childhood in the area and apply control measures to maintain quality and standard, monitor, and evaluate working performance in accordance with specified roles and duties.</p>
		<p>3) Support ecological system for learning related to teacher development, use of resources, support learning, learning sources, and local wisdom, together with development of early childhood education arrangement.</p>
		<p>4) Promote the process for exchange of knowledge in the pattern of Professional Learning Communities (PLC) via online social media, organize the annual academic seminar once a year, and collect information as a body of knowledge for early childhood education arrangement in the area.</p>

Factors	level agencies	Operational Guidelines
	Teacher Production Institute	<p>1) Design the curriculum for child caregivers who graduated at lower level than bachelor's degree and enhance important competencies essential for working.</p> <p>2) Follow up and examine quality of graduates from early childhood teachers' course and improve the teacher production system and plan for reskill/upskill development.</p> <p>3) Promote, support, and connect policy related to development of early childhood teachers, child caregivers, and assistant teachers, to the process for arranging the curriculum for early childhood teachers' development.</p> <p>4) Support operations of academic institutions and children development centers as well as giving support to area-based research</p>
	Academic Institution	<p>1) Specify strategic plan of the agency that supports development of early childhood teachers, child caregivers, and assistant teachers, under their affiliation, equally and continuously.</p> <p>2) Follow up changes in policy related to the development of early childhood children including social changes that affect quality of living and development of early childhood children.</p> <p>3) Build mutual understanding between executives, academic section, and early childhood teachers, child caregivers, and assistant teachers, to obtain holistic development and create link between early childhood education and primary education level.</p> <p>4) Develop early childhood teachers in the relationship between parents and communities to enable them build understanding and provide parents with consultations on caregiving to early childhood children.</p>

Factors	level agencies	Operational Guidelines
3. Specification of Approaches for Teacher Development	Dimension 1: Development approach for enhancing important competencies	
	Area	<p>1) Specify scope of work suitable for with expertise of the networked agencies within the area to attract all sectors to participate in enhancing important competencies, in all dimensions, for early childhood teachers, child caregivers, and assistant teachers.</p>
		<p>2) Specify the standard of training quality to grant certification of specific expertise in early childhood and provide an opportunity for highly professional experienced child caregivers who are comparatively transferable for qualification, to request such certification.</p>
	Teacher Production Institutes	<p>3) Arrange small courses/modules/learning units by using the process for active learning in the manner of off-the-job training, online training via the Massive Open Online Courses (MOOCs) system or appropriately blended with situation to enhance competencies (upskill) and promote new competencies essential for work (reskill).</p>
		<p>4) Coordinate with the area-level agencies to develop academic institutions with best practice of early childhood, within the area, to be ready as agencies for practical skills training.</p>
		<p>5) Support coaching and mentoring system in academic institutions be development of early childhood teachers and experienced child caregivers to receive quality assurance certificate until they become consultants or peer coaching.</p>
	Dimension 2: Development approach for increasing academic qualification	
	Teacher Production Institutes	<p>1) Arrange bilateral short course in module manner, of which credits from continual academic qualification can be transferable and can be the credit bank course.</p>

Factors	level agencies	Operational Guidelines
		<p>2) Design learning activities that emphasize active learning, development of problem resolution skill, advanced thinking skills, communication skill, and skill for childcare in various situations.</p> <p>3) Design the assessment by using various methods and tools, with emphasis on formative assessment</p>
<p>4. Administration of Teacher Development System</p>	<p>Dimension 1: Teacher development selection system</p> <p>Policy</p>	<p>1) Development of tools for central standard competency measurement and dissemination to agencies at various levels for use in teacher selection and arrangement for further development at a level suitable to their ability.</p> <p>2) Coordinate with original affiliations of early childhood teachers, child caregivers, and assistant teachers, as well as teacher production institutes, to inquire about requirements or necessity to receive development, for use as data-driven decision making.</p>
	<p>Dimension 2: Arrangement of curriculum for training or development</p>	<p>The agencies assigned to arrange the curriculum</p> <p>1) Design a curriculum structure that covers the aspects of knowledge, practical skills, and traits, which can be divided into 4 steps as follows.</p> <p><u>Step 1</u> Enhancing basic knowledge and skill based on important competencies (<i>knowledge enhancement</i>)</p> <p><u>Step 2</u> Practice in real situation (<i>aiming for practicality</i>)</p> <p><u>Step 3</u> Create a body of knowledge with the concept of professional learning community (<i>extracting the body of knowledge</i>)</p> <p><u>Step 4</u> Follow up and assessment of development for early childhood teachers and early childhood children (<i>follow up the success</i>)</p>

Factors	level agencies	Operational Guidelines
		2) Select teacher production institutes, academic institutions, or child development centres, which have best practices, and experts with knowledge and ability, experience, and understanding of the context of actual practice and the area-based context in the area to create network mentoring continuously following up.
Dimension 3: Measurement, assessment, and follow up of teacher development		
	The agencies assigned to arrange the curriculum	1) Specifies patterns, assessment methods, and follow-up systems for continuous personnel development, with significant emphasis on working skills and resulting outcomes of changes. 2) Control, monitor, follow up, and assess the results of development systematically and continuously, by using information to extend results for academic continuity, or support the conduct of research for jointly extracting lessons learned from professional learning development.

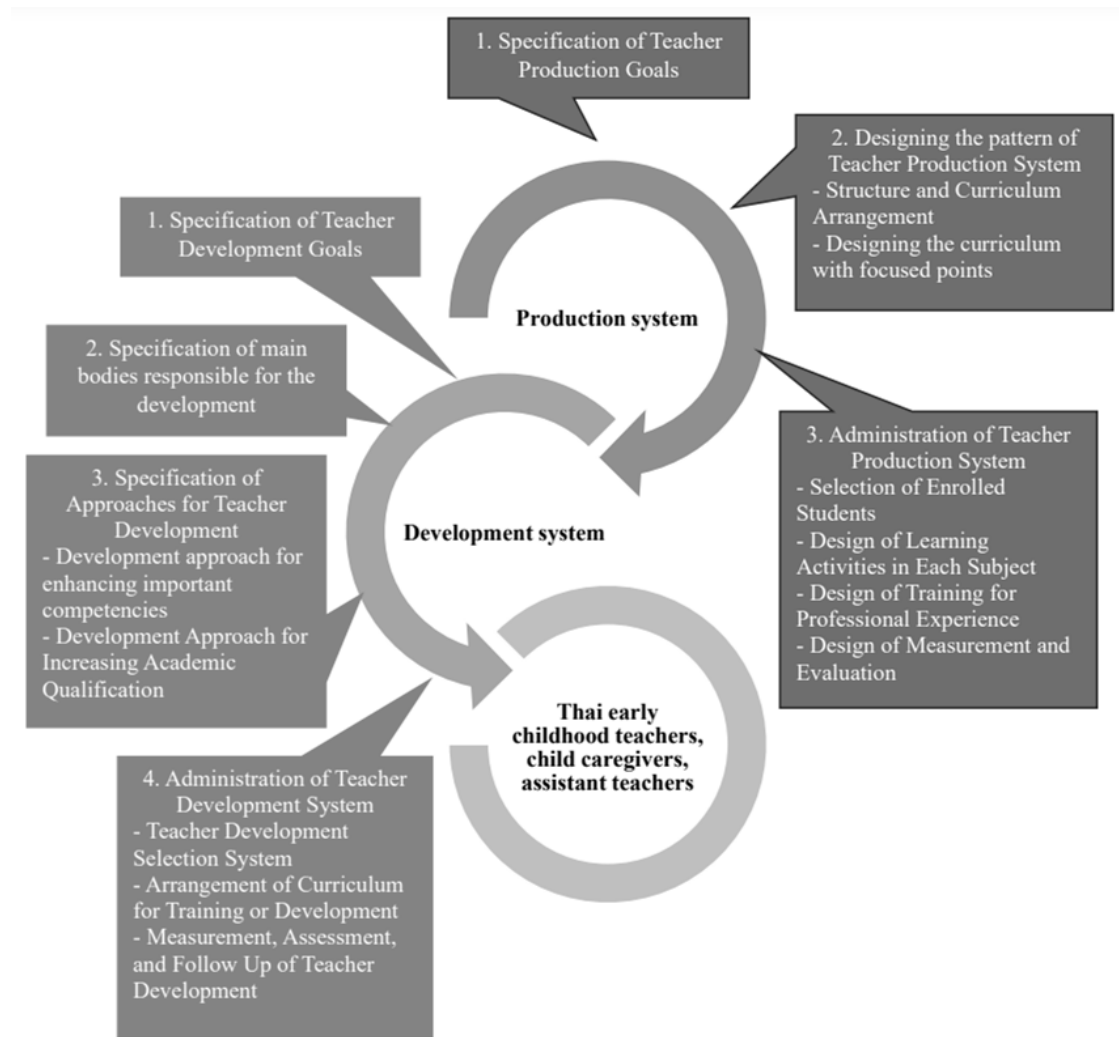


Figure 2: Integrated system of early childhood teacher production and professional development

7. Discussion

From the result of this research on guidelines for the development of the production system and development of Thai early childhood teachers, child caregivers, and assistant teachers, it was found that, in order to effectively develop the system for early childhood teachers production, central agencies responsible for national educational policy should therefore specify specific professional standard for early childhood teachers because there are various working contexts for early childhood teachers. It is essential to understand nature and needs of early childhood children, including the methods to promote the most suitable development and learning of early childhood children in order to help them achieve their optimum potential. In this regard, it is required to coordinate with parents and communities as well as foreign agencies such as NAEYC, which indicated that DAP is the most suitable method for promoting development and learning of early childhood children and specified professional standard and competencies for early childhood teachers in 2020 comprising 6 main standards for professionally promoting early childhood teachers production. Meanwhile, Australia has specified 7 professional standards for early

childhood teachers with specification of teachers' working standard for development of childhood teachers in the 21st Century.

Furthermore, enhancing strength of the system for early childhood teacher production requires cooperation with various sectors such as agencies in the area, families and communities, and teacher production institutes in the area, in order to increase potential of child caregivers and early childhood teachers who lack of experience, knowledge of early childhood education arrangement, or graduated from other field, by organizing a curriculum in the credit bank pattern in accordance with readiness and actual working condition. This approach provides people outside normal education system wider access to education, so that they can plan for learning as desired, and promote lifelong learning, which cannot be provided by traditional education system and normal university system (Trakarnpairoj, 2018). In this regard, patterns of teacher production system should conform to the context of social changes and requirements of that community. Designing of structure for each subject and pattern for organizing learning activities should be resulted from integration of multidisciplinary professions, together with information of the area-based contexts, in order to make production of early childhood teachers corresponds to requirements of graduate users, with emphasis on creating knowledge from actual experiences via practices in academic institutions or children development centers, so that teacher students can gain experience from area-based working in participation with communities. As Specht & Sandlin (1991) indicated, learning from experiences emphasizes "doing" in addition to "hearing" and "seeing" as happened in traditional learning. As such, it is the process that helps people to create knowledge through changes of experiences, of which life is as a framework of knowledge and understanding, enabling them to change the way of thinking and their behavior by themselves (Kolb, 1984), which contributes to the goals of professional teacher preparation.

Administration of teacher production system is regarded as major mission of early childhood teachers production institutions. As such, importance should be placed early from the student selection process in order to recruit, with various standard filtering tools and methods, those who recognize the importance of the early childhood teaching profession and truly wish to become teachers, by designing learning activities adjustable to current situations such as arrangement of blended learning or distance learning, with emphasis on active learning, in accordance with Thailand's National Education Act B.E.2542 (National Education Act, 1999), which is an education reform act that specifies necessity to implement active learning in classrooms because it will help support lifelong learning as well as help learners develop intellectual skill (soft skill) by improving critical thinking, problem solving skill, and mission-based learning in the active learning environment (Bogart, 2009). In this regard, it was found that previous arrangement of higher education in Thailand has also applied teaching techniques in the manner of active learning integrated with ICT to increase the learners' learning outcomes (Waluyo, 2020). Therefore, there should be various designs of measurement and evaluation, with emphasis on evaluating learners' actual condition, or so-called formative assessment, and use the method of result reflection to encourage learners to continuously improve and develop themselves. In this regard, knowledge, and skills (such as information awareness), psychological factors (such as social pressure), and social factors (such as teamworking), are all influential on the use of formative assessment, which results in professional development of teacher production curriculum (Schildkamp, et al., 2020).

When considering the guidelines for the development of the production system and development of Thai early childhood teachers, child caregivers, and assistant teachers, it was found that specification of goals for teacher development should consist of short-term and long-term planning, together with essential requirements, which corresponds to the new concept of inside-out professional development, which believes that each of individuals must set their own goal of learning new things (Sheridan et al., 2009), and emphasizes on development of both general competencies and specific professional competencies for early childhood teachers, including specific area-based competencies by upskilling and reskilling of new essential working skills that need to be up-to-date for development of early childhood children. In this regard, there should be coordination with original affiliations of early childhood teachers and teacher production institutes in the area. Teacher development can be conducted from the first 2 years of working to follow up and also examine the quality of the teacher production system.

In this regard, specification of main bodies responsible for development of early childhood teachers, child caregivers, and assistant teachers, are related to agencies at various level ranging from national-level central agencies with role to formulate policy, specify standards, qualification for teacher development, personnel allocation, and specify approaches for following-up result of teacher development, by linking information down to other levels. Meanwhile, the area-level agencies should have role in preparation of the area-based integrated development plan and coordinate with teacher production institutes in the area in order to arrange teacher development activities, support related ecological learning system in local areas in order to support teacher development and arrangement of early childhood education, and to promote creation of community networks to exchange knowledge, i.e. the Professional Learning Communities (PLC), in appropriate pattern within the area. It is recognized that teacher production institutes are agencies with significant roles in designing curriculum and arranging activities for teacher development as well as implementing result of teacher development system, which is monitored and evaluated in the first 2 years after graduation, to design curriculum appropriate for academic institutions that are original affiliations of early childhood teachers, child caregivers, and assistant teachers. The plan for teacher development should be clear and in accordance with national-level policy, social changes having influences on early childhood children, creating linkages between early childhood classrooms and primary education, by allocating resources that support teacher development and promote equal and continuous development of teachers. It can therefore be said that to effectively carry out the teacher development system, it is essential to have continuous, linked coordination and operation between agencies from various levels.

Regarding specification of guidelines for teacher development, which can be divided into 2 dimensions based on objectives of those requesting for development, i.e. to enhance important competencies and to increase of academic qualification, is in accordance with results of studies on a significant problem related to early childhood teachers, child caregivers, and assistant teachers in Thailand's previous early childhood education arrangement, which is mainly lack of knowledge and understanding in arrangement of early childhood education and having unmatched academic qualification, resulting in inadequate ability to provide learning experiences to early childhood children, inability to create network or participation with communities, local areas, and governors (Kongsanoh, S., 2015; Chuanpayak, M., 2015; Panchote, M. & Singpan, P., 2017). Therefore, there should be an opportunity provided to early childhood teachers, child caregivers, and assistant

teachers, for inclusively enhancing their important competencies for working, so that they can comparatively transfer their professional experiences to request for certification of their expertise, through various kinds of short-course training, and arrange follow-ups and provide assistance by coaching and mentoring process, by experts experienced in early childhood education arrangement, as this will facilitate effective administration and management, support self-learning and development, and also encourage sharing of knowledge and related resources.

Regarding guidelines for teacher development system, it can be conducted in 3 steps including 1) selection system for teacher development, which should prepare standard tools for measuring important competencies of early childhood teachers in order to carefully select teachers and rank their competencies, 2) arrangement of training or development courses that cover development of knowledge, practical skills, and traits, by creating a network of academic mentors to continuously provide advices and assistance within the area as well as to promote exchanges of learning via PLC, and 3) evaluation and follow-up of teacher development which is carried out systematically and continuously.

8. Conclusion

From this study, it was found that the patterns for development of early childhood teachers, child caregivers, and assistant teachers, which were developed and used by 3 universities, are different based on selection of conceptual principles for teacher development, and all patterns have outstanding process used for teacher development and consider suitability of the area-based context to correspond to actual working conditions. In this regard, although each academic institution is diverse in terms of personnel's readiness and budget, one of important factors that helps operational development of early childhood teachers, child caregivers, and assistant teachers to be successful is the support from communities and relevant agencies. Therefore, agencies or teacher production institutes that wish to arrange teacher development projects, with effective outcomes, should encourage participation with communities and agencies in the area as integral part of development process by using the area-based context for designing activities in accordance with actual working conditions and early childhood development. Furthermore, the mentoring system should be used for help in continuously following up results of development, which may be carried out by creating a network of mentoring in cooperation with education-related agencies such as, for instance, educational supervisors and university lecturers.

From guidelines for the development of the production system and development of early childhood teachers, child caregivers and assistant teachers in the administration aspect, it was found that, in all factors, there is relevancy with agencies in various levels. Therefore, to successfully implement these guidelines, there should be coordinated cooperation and systematically linked information. In this time, an important finding of production system development and teacher development clearly shows that the production system and development system cannot be separated. Both systems are clearly interrelated and supportive of each other.

This study has some limitations that should be acknowledged. The synthesis was based on research findings from only three universities supported by the Equitable Education Fund (EEF), which may not fully represent the diversity of teacher production

institutes and early childhood teacher development contexts across Thailand. Differences in institutional readiness, local contexts, and resource availability may influence the applicability of the proposed guidelines in other settings. Therefore, caution should be exercised when generalizing the findings at the national level.

Nevertheless, the 32 operational guidelines for the teacher production system and the 41 operational guidelines for the teacher development system provide an important foundation for future policy implementation and system reform. Future research should examine how these guidelines are adopted, implemented, monitored, and evaluated across different educational contexts over the next decade. Longitudinal monitoring systems and policy evaluation mechanisms should be established to track implementation outcomes, institutional adaptation, and the long-term effectiveness of these guidelines in improving the quality of early childhood teachers, child caregivers, and assistant teachers in Thailand.

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10. Author contributions statement

Charoensuk, O.: project leader; participation in project administration, conceptualization, research design, data collection, data analysis and writing-original draft preparation

Sommitr, R.: coresearcher and essentially intellectual contributor; participation in research design, data collection, data analysis, writing-review and editing

Tulmethakaan, M.: co-researcher; participation in research design, data collection, data analysis, writing-review and editing

All authors drafted the manuscript, provided critical revisions to the manuscript, have read, and agreed to the published version of the manuscript.

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