Teacher Development to Collaboratively Improve Learning Environment of an Early Childhood Development Center

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Abstract

This research seeks to explore the perspectives of academics and educational organizations on the intricate development of learning environments that are instrumental in enhancing the pedagogical effectiveness of teachers within Early Childhood Development Centers. The ultimate aim is to empower teachers to implement the Knowledge and skills acquired through this improved learning environment, ensuring that these learning outcomes translate into effective and efficient teaching practices. The study utilized a Research and Development methodology, culminating in the formulation of an innovative educational program titled "Online Self-Training Program for Developing Teachers to Collaboratively Improve Learning Environment of an Early Childhood Development Center." This comprehensive program encompasses two pivotal projects: 1) the Teacher Learning Development Project, which focuses on advancing the skills and competencies of teachers, and 2) the Teachers Leading Learning Outcomes to Development Project, which emphasizes the role of educators in fostering significant learning advancements. The research culminated in a robust experimental study that adopted a group Pretest-Posttest design, involving a cohort of 5 dedicated teachers and 38 engaged parents from a local school. The results from this research phase revealed that the educational innovation met the predefined quality standards outlined in the research hypothesis and demonstrated significant potential for dissemination. This indicates that educational innovation can be effectively shared and implemented across various schools nationwide, reaching a broader audience within the targeted educational landscape.

Keywords: learning environment, teacher development, early childhood development center

1. Introduction

1.1 Importance of the Research Problem

The Online Self-Training Program for Teacher Development is a crucial innovation that enhances the quality of education within Early Childhood Development Centers (ECDCs) in Thailand. This program addresses the pressing need for improved teaching methodologies and environments, ensuring educators have contemporary knowledge and skills that align with the evolving educational landscape.

The significance of this program is underscored by Thailand's constitutional mandate, which guarantees children a quality education. Legislative reforms emphasize the state's responsibility to enhance human capital and improve educational outcomes (The Secretariat of the Minister, 2021). The ECDCs, particularly in rural areas, confront various challenges, including inadequate teacher qualifications, poor infrastructure, and insufficient teaching resources. An Online Self-Training Program responds to these challenges by providing educators with accessible and flexible training options that can be adapted to their specific contexts.

The program aims to equip teachers with knowledge and foster a collaborative learning environment that directly impacts the quality of education. By integrating learning environments that include physical and social contexts (The Glossary of Educational Reform, 2014), the program seeks to elevate educational standards and outcomes.

The Online Self-Training Program is structured around two key projects:

1. Teacher Development Project: This project comprises eight learning modules to enhance teachers' pedagogical

skills and understanding of contemporary educational practices. These modules cover essential topics related to early childhood education, enabling teachers to engage deeply with material relevant to their teaching context.

2. Teacher Implementation of Learning Outcomes Project: This aspect focuses on the practical application of the knowledge gained in the teacher development modules. It encourages teachers to actively implement and assess learning outcomes in their classrooms, fostering a cycle of continuous improvement.

Additionally, the program includes a comprehensive set of work manuals that provide detailed guidelines and best practices for educators. These manuals help bridge the gap between theoretical knowledge and practical application, ensuring teachers can effectively integrate new techniques into their teaching strategies.

Implementing the Online Self-Training Program involves several key steps:

1. Needs Assessment: Conduct a thorough analysis of educators' current challenges at ECDCs. This will inform the development of the learning modules and ensure they are tailored to practitioners' needs.

2. Development of Learning Modules: Collaborate with educational experts to create engaging, evidence-based learning modules focused on essential teaching competencies for early childhood education.

3. Training and Orientation: Provide introductory sessions to familiarize educators with the online platform and ensure their comfort with digital learning methodologies.

4. Flexible Access: Ensure the online modules are accessible to teachers at convenient times, accommodating their teaching schedules and personal commitments.

5. Continuous Evaluation and Feedback: Implement mechanisms for ongoing feedback and Assessment of the program. This could include surveys and performance evaluations to measure the effectiveness of the training and its impact on teaching practices.

6. Community Building: Foster a community of practice among educators enrolled in the program. This could include online forums, webinars, and collaborative projects, encouraging sharing of insights and strategies among peers.

By following these implementation steps, the Online Self-Training Program can significantly enhance the capacity of teachers, leading to improved educational outcomes for children in ECDCs. Ultimately, this program aligns with the broader goals set forth by the National Education Act of 1999, promoting a quality educational framework that meets the needs of diverse learners.

In summary, integrating this Online Self-Training Program into the professional development of early childhood educators in Thailand is a vital strategy to bolster the quality of education, address existing challenges, and pave the way for holistic child development. The program empowers teachers and ensures that the educational experiences provided to children are richer and more effective, supporting their transition into basic education.

1.2 Objectives

This research aimed to investigate the varied perspectives of academics and educational organizations on the importance of cultivating a collaborative learning environment that significantly boosted the professional capabilities of educators at the Early Childhood Development Center. By employing a Research and Development (R&D) methodology, the study aimed to design an innovative "Online Self-Training Program for Developing Teachers." This comprehensive program consisted of two distinct but interconnected initiatives:

1) The Teacher Learning Development Project focused on providing structured learning experiences that enhanced pedagogical skills and knowledge through online modules, interactive resources, and peer collaboration.

2) The Teachers Leading Learning Outcomes to Development Project, which empowered educators to take charge of their professional growth by developing leadership skills and strategies that promoted positive learning outcomes within their classrooms.

Together, these projects aimed to create a holistic framework that supported teachers and fostered a community of practice centered on continuous improvement and shared learning.

1.3 Hypothesis

The research focuses on an online self-training program based on the principle that "Knowledge and Action are Power." This program aims to create practical learning modules for teacher self-development, which they will apply to their students. Following the R1D1... RiDi framework, we hypothesize that: 1) In the "Teacher Learning Development Project," teachers in the experimental group will achieve post-experiment test scores meeting the 90/90

standard, significantly higher than pre-experiment scores. 2) In the "Teachers Lead Learning Outcomes to Development" project, parent evaluations of students in the experimental group will show significant improvement post-experiment compared to pre-experiment levels.

1.4 Literature Review

In the examination of literature about the Learning Environment of the Early Childhood Development Center, as well as prior research aimed at fostering educational innovations through online self-training programs, we referenced studies such as those conducted by Mopara and Sanrattana (2023), which focused on developing educators to enhance students' 21st-century skills, and the work of Nukoonkan and Dhammapissamai (2023), which centered on improving teachers' project management abilities for student development. The research capitalized on advancements in digital technology and the extensive availability of knowledge on the Internet in the 21st century. We emphasized analyzing the perspectives and insights of academics and educational institutions, systematically selecting high-quality articles aligned with our objectives in creating practical learning modules for educators. We clarified that our focus did not encompass scientific knowledge derived from quantitative research, as we primarily sought to identify variables or indicators. The topics we investigated include:

1. Definition of Early Childhood: This topic involved insights from sources such as the American School (n.d.), Goodwin (n.d.), Moriarty (n.d.), University of Pennsylvania (n.d.), and University of Massachusetts (n.d.).

2. The Learning Environment for Early Childhood: Perspectives from Conti and Krever (2021), Heiskell (2020), Thompson (2020), Pratt-Fartro (2020), Falk (2019), and the University of Nebraska–Lincoln (n.d.) were included.

3. Classroom Design Principles for Early Childhood: We reviewed positions held by Chia (2021), Knechel (2021), Lovaglio (2020), Kaplan Early Learning Company (n.d.), and Preschool Plan It (n.d.).

4. Classroom for Early Childhood - Principles/Concepts/Techniques/Methods/Activities: Sources included Xuan (2021), School Specialty (2019), Catherine (n.d.), Firstieland (n.d.), Kaplan Early Learning Company (n.d.), and O'block (n.d.).

5. Teachers for the Early Childhood Classroom: Insights were gathered from the New South Wales Government Website – Education (2021), The University of New Mexico (2021), Queensland Government (2023), KLA Schools of Aventura (2021), Opetusalan Ammattijärjestö (n.d.), and Resources for Employers (n.d.).

6. Early Childhood Classrooms: Perspectives from Kaplan Early Learning Company (n.d.), Pocket Of Preschool (n.d.), and Yerty (n.d.) were analyzed.

7. Internal and External Conditions of the Early Childhood Classroom: This included viewpoints from Bored Teachers (n.d.) and The Empowered Educator (n.d.).

8. Evaluation of the Early Childhood Learning Environment: We examined evaluations provided by Hancock and Carter (2011), Nanopdf.com (2018), Quality First (n.d.), The Canadian Partnership for Children's Health and Environment (CPCHE) (n.d.), and Virtual Lab School (n.d.).

This literature review aims to synthesize these various perspectives to better understand and enhance the learning environment for early childhood education.

Based on the study of relevant literature on the above topics, if the content is presented in learning modules and teachers participate in self-training online, they will understand all issues comprehensively. This, in turn, will enable the practical application of the learning outcomes in the classroom or with students.

Among those topics, we find the "developmental approach" particularly significant. This perspective on Early Childhood education encompasses principles, concepts, techniques, methods, and activities It highlights various options for implementation—some familiar but many yet to be explored—given the shifts required in the 21st century.

We synthesized 43 "developmental approaches" from these references, which include:

1. Building an incredible naturalness

2. Making it home-like, warm, and inviting

3. Keeping it simple and easy to understand

4. Choosing a suitable color tone

5. Good space planning

6. Safe and sustainable furniture
7. Making full use of displays
8. Creating good ambience
9. Creating the right environment
10. Understanding how layout affects learning
11. Ensuring student safety
12. Fostering emotional security
13. Incorporating varied learning spaces
14. Providing materials to renew interest and engagement
15. Helping kids grow socially
16. Aiding kids in becoming more self-aware
17. Establishing a reading center
18. Setting up a writing center
19. Creating a dramatic play center
20. Developing an art and crafts center
21. Designing a sensory center
22. Formulating a science center
23. Introducing a math center
24. Ensuring learning feels like play
25. Offering opportunities for small group work
26. Promoting literacy everywhere
27. Establishing a teacher center
28. Providing practice opportunities
29. Encouraging independence
30. Promoting responsibility
31. Considering classroom size
32. Being aware of the students in the class
33. Creating separate center areas
34. Utilizing learning center tubs
35. Exploring learning center possibilities
36. Including blocks for play and learning
37. Integrating technology
38. Considering permanent fixtures like sinks, windows, and closets
39. Managing noise levels in learning centers
40. Creating an organized space that conveys classroom structure
41. Making the classroom environment a place for student choice
42. Displaying students' work and art
43. Showcasing pictures of each child

Each of these approaches contributes to an enriched learning environment that promotes the well-being and development of young learners.

1.5 Critical Overview of Developmental Approaches

The learning environment of an Early Childhood Development (ECD) Center plays a crucial role in shaping the

educational experiences of young children. It is important to adopt a "developmental approach," which prioritizes principles, concepts, techniques, methods, and activities that accommodate the evolving demands of the 21st century. A synthesis of 43 developmental approaches reveals key strategies that can collaboratively enhance the learning environment, fostering children's academic and social-emotional growth.

1. Creating an Inviting Atmosphere: Making spaces home-like, warm, and inviting (approaches 2 and 8) stems from research highlighting how comfortable environments positively influence children's emotional security and willingness to explore (Brown & O'Brien, 2019). Providing a sense of belonging through personalization, such as showcasing children's artwork (approach 42), can further promote engagement and ownership of the space (Ratten, 2021).

2. Space Design and Organization: Good space planning (approach 5) and understanding layout effects (approach 10) are crucial in facilitating learning experiences. Studies emphasize the significance of flexible learning spaces that encourage collaborative learning (Robinson & Jordan, 2020). This includes designing separate centers for focus areas such as literacy, math, and sensory exploration (approaches 17-24), which cater to different learning styles and developmental needs.

3. Emotional and Physical Safety: Ensuring student safety (approach 11) and fostering emotional security (approach 12) must be prioritized. Research indicates that safe and sustainable furniture (approach 6) alongside effective noise management strategies (approach 39) can help create a conducive environment that mitigates stressors, allowing children to thrive academically and socially (Miller, 2022).

4. Promoting Independence and Responsibility: Encouraging independence (approach 29) and promoting responsibility (approach 30) is essential for developing self-aware children (approach 16). As highlighted by Vygotsky's social development theory, creating opportunities for small group work (approach 25) emphasizes learning through interaction. Incorporating varied learning spaces (approach 13) can facilitate individual choice and agency (approach 41), further nurturing life skills such as decision-making and collaboration (Brooks & Thorne, 2023).

5. Integrating Technology and Innovation: Contemporary ECD centers should integrate technology (approach 37) while ensuring that learning remains playful (approach 24). Utilizing digital resources can expand engagement strategies, allowing children to explore subjects while still valuing hands-on play (Gonzalez, 2018) interactively.

While the developmental approach highlights a proactive method for enhancing the learning environment, specific controversies arise concerning its implementation. Some critics argue that emphasizing play may unintentionally undermine academic rigor (Turner, 2020). However, growing bodies of evidence (Goldstein, 2021) suggest that play is not merely an adjunct to learning but a fundamental component that fosters creativity, problem-solving, and critical thinking skills.

The varying perspectives on the balance between structured activities and free play indicate an evolutionary relationship among studies that continue to shape the ECD landscape. As researchers investigate the impacts of new educational trends, the ongoing dialogue between play and rigorous academic standards continues to inform best practices in developing collaborative, engaging environments for young learners.

The synthesis of these developmental approaches offers a comprehensive perspective on how to improve the learning environment of an ECD Center collaboratively. Educators can create a nurturing space that aligns with contemporary educational demands by integrating emotionally supportive design, flexible learning opportunities, and innovative technology in a safe manner. Continuous research will remain critical as we navigate the complexities of early childhood education, adapting to the evolving needs of children and educators alike.

2. Research Methodology

2.1 Concept and Procedure

This research applied the Research and Development (R&D) Methodology to create an effective online self-training program as part of an educational innovation comprising two projects: 1) developing teachers' learning and 2) enabling teachers to apply learning outcomes. Sanrattana (2023) emphasized the importance of incorporating up-to-date Knowledge from reliable sources to create Learning Modules that develop teachers and enhance student learning, moving beyond the traditional view of "Knowledge is Power." The research steps in the R1D1 .... RiDi format were as follows:

R1D1 process: A literature study on the Learning Environment of the Early Childhood Development Center was

conducted, focusing on eight key issues outlined in the Literature Review. This resulted in eight learning modules created from credible articles.

R2D2 process: An online self-training program was developed with two projects: 1) Teacher Learning Development Project, featuring eight modules based on R1D1 topics, and 2) Teachers Leading Learning Outcomes to Development Project, which includes definitions, the importance of the Learning Environment, classroom design principles, development guidelines, teacher roles, conditions within and outside classrooms, and assessment forms for parents' perceptions and teacher reflections (complete structure available in Thai at http://www.mbuisc.ac.th/phd/Module9/Chawee.pdf).

R3D3 process: The content's validity, especially the English-to-Thai translation, was evaluated through Focus Group Discussions with teachers at a different Early Childhood Center, divided into two phases: "Preliminary Field Testing" with five teachers and "Main Field Testing" with ten.

R4D4 process: Two research instruments were developed: 1) A teacher learning outcomes test and 2) A parents' perception assessment form regarding the Learning Environment.

R5D5 process: The effectiveness of the online training will be tested through an experimental study using a One Group Pretest-Posttest Design in a randomly selected Early Childhood Center, involving five teachers and 38 parents in the second semester of the 2024 academic year. The research will occur in two phases: one month on Teachers' Self-Development and two months on Teachers' Transformation of Learning Outcomes into Practice.

2.2 Research Tool

The Teacher Learning Outcome Test was a 4-choice multiple-choice type created according to the Cognitive Domain, ranked from the skills of remembering, understanding, applying, analyzing, evaluating, and creating according to A Revision of Bloom's Taxonomy (Krathwohl, 2002). This test was examined for quality in 2 stages:

In the first stage, five educational experts examined Content Validity using the Indexes of Item-Objective Congruence (IOC) method of Rovinelli and Hambleton (1977). The data analysis found that all questions in this test could be used for the intended measurement because the IOC value was higher than the 0.50 criterion (Chaichanawirote & Vantum, 2017).

In the second stage, the quality of the entire test was examined by trying it out with 30 teachers at the Early Childhood Development Center, which was not an experimental area. The results of the data analysis found that all questions had an Index of Difficulty according to the criteria, which was between 0.20 - 0.80. They had a Power of Discrimination according to the requirements from 0.20 to 1.00. The KR-20 value, which represents the coefficient of reliability, was equal to 0.90, which is higher than the criteria of 0.70, and the test's difficulty was equal to 68.24. Compared to the criteria of 0.61 – 0.81, it is considered a test of moderate difficulty.

The Assessment of Parents' Perception of the Learning Environment of the Early Childhood Development Center utilized a 5-level Rating Scale, which included categories ranging from "the most" to "most diminutive." This assessment was constructed based on studies related to the characteristics of the Learning Environment from various sources, including Chia (2021), Knechel (2021), Lovaglio (2020), Kaplan Early Learning Company, and Preschool Plan It. Furthermore, it incorporated insights from assessment guidelines provided by Hancock and Carter (2011), Nanopdf.com, Quality First, The Canadian Partnership for Children's Health and Environment, and Virtual Lab School.

Two phases of checks were implemented to ensure the quality of the assessment. Initially, content validity was evaluated by five educational experts, who determined that all questions had an Item Objective Congruence (IOC) value exceeding 0.50. This result indicated the suitability of the questions for their intended purpose. The second phase assessed the Reliability or Internal Consistency by administering the assessment to 30 students at the Early Childhood Development Center, a non-experimental setting. Data analysis revealed that the Alpha Coefficient of Reliability for the entire assessment form was more significant than 0.70, meeting the acceptable criterion George & Mallery (2003) outlined.

2.3 Data Analysis

Data were analyzed according to the 90/90 criteria defined by Yamkasikorn (2008). The first 90 is the average score percentage of the group of teachers, and the second represents the percentage of teachers passing the test for all objectives. Mean scores from pre-and post-tests were compared using a dependent t-test.

3. Results

The results of the research to test the effectiveness of the "Online Self-Training Program for Developing Teachers to Collaboratively Improve Learning Environment of an Early Childhood Development Center." were found to be by the research hypothesis as follows:

3.1 Results of Testing the Research Hypothesis No. 1

After conducting the experimental research based on the self-development project for teachers in the R5D5 step, the following findings were recorded: 1. Five teachers from the experimental group achieved an average post-experiment test score of 32.40 points, which corresponds to 94.60 percent of the total score of 36 points, aligning with the initial 90 standard criteria. 2. 98.33 percent of the teachers in the experimental group successfully passed the test according to all established objectives, consistent with the final 90 standard criteria.

Furthermore, the analysis of the teachers' performance revealed that their average pre-experiment test score was 26.20 with a standard deviation of 3.38, while the average post-experiment test score was 32.40 with a standard deviation of 32.40. For the dependent t-test for analysis, it was determined that the post-experiment test scores were significantly higher than the pre-experiment scores at the 0.05 level, as shown in the data analysis results in Table 1.

Table 1. Compare the Pre-test and Post-test Mean Scores from the Teacher Learning Achievement Test Using a Dependent t-test

Testing	Sample size	Mean	Standard Deviation	t
Pre-test	5	26.20	3.38	3.49*
Post-test	5	32.40	1.14	

* $p < 0.05$

3.2 Results of Testing the Research Hypothesis No. 2

Following the experimental research based on the teachers' project implementing learning results in the R5D5 step, it was observed that preschool students could not respond to the evaluation questions. Consequently, we engaged 38 parents of preschool students from the experimental research area, who had an opportunity to observe and assess the developmental outcomes to evaluate this phase. The evaluation results were presented as means and standard deviations, encompassing overall outcomes and classifications for each aspect. A comparison of the data collected before and after the experiment is provided in Table 2 as follows:

Table 2. Mean and Standard Deviation of the Expected Characteristics of the Learning Environment of the Early Childhood Development Center from the Perception of Students' Parents before and after the Experiment, Overall and by Aspect

Expected Characteristics of the Learning Environment of the Early Childhood Development Center	Evaluation			
	before		After	
	$\bar{\chi}$	S.D.	$\bar{\chi}$	S.D.
The Classroom Conditions	3.20	0.49	4.56	0.60
1) Well ventilated	3.47	0.60	4.32	0.77
2) Young children are given opportunities to gain self-help skills.	3.68	0.90	3.58	1.00
3) Enough open space to support various types of activities.	2.79	0.41	3.89	1.06
4) Sufficient and appropriate lighting for children.	2.87	0.34	4.63	0.75
5) The kindergarten classroom is decorated attractively.	2.68	0.47	4.13	0.81
6) The color tone is selected to suit children.	2.76	0.43	4.63	0.82
7) Writing space is provided.	3.16	0.49	4.92	0.36
8) There is an area for arts and crafts.	3.16	0.37	4.97	0.16
9) Science area is provided.	3.00	0.46	4.95	0.32
10) The mathematics area is organized.	3.21	0.41	4.95	0.32
11) A library/reading area is provided.	3.50	0.56	4.29	1.04
12) Be safe by choosing materials with no sharp edges and small parts suitable for children.	3.84	0.37	4.87	0.34

13) Displays and decorations are arranged at eye level for children.	3.47	0.51	3.89	1.06
14) There are tables, chairs/or space for individual and group work.	3.76	0.43	4.79	0.53
15) The display area for children's artwork is arranged at eye level.	2.68	0.47	4.95	0.32
16) There is a storage area for children's belongings.	3.03	0.64	4.97	0.16
17) There are materials and equipment for art or writing.	3.29	0.52	4.87	0.34
The Classroom's External Conditions	3.11	0.46	4.08	0.81
18) There are outdoor areas to enhance children's play and learning experiences.	2.92	0.36	4.68	0.66
19) Play areas include sandboxes, climbing frames, tunnels, and balance beams. Musical instruments, swings, slides, climbing sticks	3.26	0.60	4.58	0.92
20) There are portable play areas with balls, ride-ons, push toys, ribbons, magnifying glasses, shovels, and buckets.	3.00	0.33	4.58	0.79
21) There is a sandy area.	3.82	0.39	4.47	0.80
22) There is space for digging.	3.16	0.55	3.79	0.84
23) There is a climbing area.	2.87	0.53	3.82	0.90
24) There is an outdoor kitchen area.	3.34	0.53	3.84	0.97
25) There is an area for using walls and fences.	2.84	0.49	2.84	0.59
26) There is a secret area that invites children to play surrounded by nature.	3.16	0.37	3.47	0.95
27) There is an open grass area for running, kicking, and throwing.	2.71	0.46	4.73	0.49
Teaching and Learning	3.06	0.56	4.08	0.81
28) Young children are given opportunities to gain self-help skills.	3.63	0.54	4.68	0.66
29) There is a practical or experimental teaching arrangement.	2.66	0.48	4.58	0.92
30) There is a teaching method through storytelling, which involves telling the stories of stories to each other.	3.24	0.43	4.58	0.79
31) Role-playing teaching is provided.	2.82	0.39	4.47	0.80
32)	3.11	0.65	3.79	0.84
33) There is a demonstration teaching method. The teacher will demonstrate and give instructions on how to follow.	3.29	0.61	3.82	0.90
34) Teaching is organized using games.	2.71	0.80	3.84	0.97
35) Discussion-based teaching is provided.	3.05	0.57	2.84	0.59
36) Off-site learning is provided.	3.03	0.64	3.47	0.95
Activities for Kids to Do	3.14	0.48	4.73	0.49
37) There are gardening activities to grow food plants in the childcare center.	3.29	0.52	4.97	0.16
38) Tree planting activities	2.92	0.36	4.97	0.16
39) Cooking activities	3.26	0.60	4.66	0.53
40) There are activities to avoid creating waste/activities to make compost from food scraps.	3.13	0.34	4.95	0.32
41) Play and movement activities that promote the development of small muscles	3.76	0.49	4.89	0.31
42) Develop hand-eye coordination by stringing large beads and solving simple puzzles.	3.16	0.55	4.79	0.47
43) Self-help skills training activities such as buttoning, zipping, and snapping	2.87	0.53	4.84	0.55
44) Activities demonstrate strength and control using various control materials such as scissors, pencils, crayons, small toys, and building blocks.	3.34	0.53	4.84	0.37
45) Activities to practice self-care skills and independent self-help include washing hands, brushing teeth, using the toilet, dressing, and eating.	2.84	0.49	4.97	0.16
46) Activities using various materials to create, paint, draw, and sculpt.	3.16	0.37	4.82	0.56
47) Exploration and imagination activities	2.71	0.46	4.76	0.71
48) recycled materials with herbs	3.63	0.54	4.68	0.66
49) Outdoor wall activities	2.66	0.48	3.50	1.06
50) Activities to send information to parents, such as newsletters, holding regular parent/teacher meetings, and keeping them informed about their children's activities.	3.24	0.43	4.58	0.79
Total	3.14	0.11	4.50	0.29

Table 2 presents the evaluation results of the Learning Environment characteristics at the Early Childhood Development Center, as perceived by the parents of students in the experimental group. The average score from the pre-experiment evaluation was recorded at 3.14 with a standard deviation of 0.11. In contrast, the average score of the post-experiment assessment was 4.50, accompanied by a standard deviation of 0.29. Analysis using a Dependent t-test revealed that the post-experiment evaluation scores were significantly higher than those of the pre-experiment evaluation, with a statistical significance at the 0.05 level, as shown in the data analysis results in Table 3.

Table 3. Analyze and Compare the Average Scores from the Evaluation Results of the Student's Parents before and after the Experiment Using a Dependent t-test

Evaluating	Sample size	Mean	Standard Deviation	t
Before	38	3.14	0.11	24.57*
After	38	4.50	0.29	

* $p < 0.05$

The outcomes of the research hypothesis tests conducted in items 1 and 2 provide compelling evidence regarding the efficacy of the "Online Self-Training Program for Developing Teachers to Collaboratively Improve Learning Environment of an Early Childhood Development Center." This program is structured around two distinct projects:

1. The Teacher Learning Development Project includes eight modules covering different aspects of early childhood education. These modules are about understanding what early childhood means, creating a great learning environment, and figuring out how to design classrooms effectively. They also examine what teachers need to know for early childhood classrooms and how to evaluate the learning environment. The eight modules are: 1. Definition of Early Childhood. 2. The Learning Environment for Early Childhood. 3. Classroom Design Principles for Early Childhood. 4. Classroom for Early Childhood. 5. Teachers for the Early Childhood Classroom. 6. Early Childhood Classrooms. 7. Internal and External Conditions of the Early Childhood Classroom. 8. Evaluation of the Early Childhood Learning Environment

2. On the other hand, the Teachers Leading Learning Outcomes to Development Project has a detailed module with several vital sections to help improve teaching practices and assess the learning environment. This includes instruction guidelines, expected characteristics, and a development process summary. There's also a questionnaire for parents to share their views on the learning environment at the Early Childhood Development Center and self-assessment forms for teachers to evaluate how they're doing and reflect on their practices. This happens through Google Forms, making it easy to gather feedback and insights.

The significance of these findings lies in the program's potential as a practical educational innovation. This innovation is particularly crucial in early childhood education, where establishing a conducive learning environment is vital for the developmental success of young learners. The framework for this innovation aligns with the research and development (R&D) methodology principles, which emphasize systematic research and development processes.

In this context, the R&D methodology involves conducting comprehensive tests within a representative population sample to gather data on the program's effectiveness. The results from these experiments demonstrate that the program not only meets but exceeds the specified criteria for practicality and effectiveness in educational settings. Given these positive outcomes, the next step involves disseminating the findings and the program to the target population, ensuring that it reaches educators who can benefit from and implement these innovative practices within their learning environments. This dissemination process is vital for maximizing the program's impact across various educational settings, thereby contributing to an overall enhancement of early childhood education.

3. Discussion

The research presented delves into the various perspectives of academics and educational organizations regarding the necessity of fostering a collaborative learning environment to enhance the professional capacities of educators at the Early Childhood Development Center. The study employed a Research and Development (R&D) methodology to create an "Online Self-Training Program for Developing Teachers." Two interlinked initiatives anchor this program:

1) The Teacher Learning Development Project, which offers structured learning experiences aimed at improving pedagogical skills and Knowledge through online modules, interactive resources, and peer collaboration.

2) The Teachers Leading Learning Outcomes to Development Project empowers educators to take ownership of their professional growth and develop leadership skills and strategies that yield positive learning outcomes in their classrooms.

These initiatives work together to establish a comprehensive framework that supports teachers and fosters a community of practice focused on continuous improvement and shared learning experiences.

The management of the Early Childhood Development Center, administered by The Department of Local Administration, operates mainly in rural areas that require enhanced support to ensure standardized, high-quality operations across various facets of education. Many educators, accustomed to previous methods, face challenges in improving their learning capabilities to obtain 21st-century Knowledge. Consequently, this research seeks to explore the perspectives of academics and educational organizations on cultivating learning environments that leverage such Knowledge to boost teachers' learning abilities, enabling them to apply their acquired skills effectively and efficiently.

Utilizing an R&D methodology with a structured approach (R1D1…RiDi), the research resulted in the educational innovation known as the "Online Self-Training Program for Developing Teachers to Jointly Develop the Learning Environment of the Early Childhood Development Center." This program fulfilled the effectiveness criteria specified in the research hypothesis, aligning with the Teacher Learning Development Project and the Teachers Leading Learning Outcomes to Development Project.

The findings revealed that the research plan's design effectively focused on the concept of Knowledge and Action as Power. This was achieved by leveraging Knowledge from credible articles and organizations to create learning modules that facilitate teachers' understanding, which they could apply in their classrooms.

This emphasis on Knowledge and action as power resonates with Sanrattana (2023), who criticized prior teacher development initiatives for prioritizing budget allocations over genuine professional growth. Many development activities, often scheduled just before the fiscal year-end, resulted in content that failed to impact professional development or students' learning advancement significantly. The guidelines for teacher professional development have traditionally seen Knowledge as power. However, this research proposes an evolved perspective that intertwines Knowledge with actionable implementation, stressing the importance of structuring activities that empower teachers to enhance their practices continuously and, by extension, their students' learning outcomes.

Numerous scholars have underscored the synergy between Knowledge and action as powerful influences. Oppong (2019) stated, “Knowledge is abundant, accessible, and portable. However, it is no longer power. The new power is wisdom, the application of Knowledge." Similarly, Robbins (n.d.) asserted, "Knowledge is NOT power. Knowledge is only POTENTIAL power. Action is power." Stankovich (2020) echoed this by stating, "Knowledge is Power — But Only if You Use it." Furthermore, Ofpad, the School of Genius (n.d.), succinctly illustrated this concept by equating Knowledge to bullets and action to a gun: without action, Knowledge remains ineffective.

Thus, initiatives aimed at nurturing learner development require a shift from the archaic notion of "Knowledge is power" to the comprehensive understanding that Knowledge and action constitute true power. By adopting this perspective, educational development efforts can cultivate genuine success.

When utilizing Knowledge from well-founded sources to create empowering learning modules, these modules must support teachers' personal development. This will enable educators to thoroughly understand the content and apply the insights gained effectively in their classrooms. The insights shared in these articles embody each writer's perspective on critical educational concepts, encompassing definitions, significance, core traits, developmental strategies, potential challenges, and evaluation methods.

Unlike traditional research that primarily investigates variable relationships or general principles from textbooks, these articles afford deeper insights and specialized viewpoints on significant educational issues. Previously, access to such Knowledge was limited by the necessity for physical materials, constraining dissemination across communities.

Advancements in digital technology in the 21st century have fostered the emergence of a knowledgeable society. Numerous experts and organizations are now publishing their insights in articles that are globally accessible and free from time or geographical restrictions. This opens opportunities for obtaining high-quality, relevant Knowledge tailored to specific research needs.

The research team explored various aspects of the Learning Environment of Early Childhood Development Centers, including:

- Definition of Early Childhood
- Learning Environment for Early Childhood
- Principles of Early Childhood Classroom Design
- Classrooms for Early Childhood: Principles, Concepts, Techniques, Methods, and Activities
- Teachers in Early Childhood Classrooms
- Early Childhood Education Classrooms
- Internal and External Conditions of Early Childhood Education Classrooms
- Evaluation of Early Childhood Learning Environments

The findings of this research align closely with the study conducted by Mopara and Sanrattana (2023), which emphasized the importance of preparing educators to cultivate essential 21st-century skills in their students. Their work highlighted various strategies and methodologies designed to enhance critical thinking, collaboration, and digital literacy among learners. Additionally, this research resonates with the efforts made by Nukoonkan and Dhammapissamai (2023), who focused on empowering teachers with advanced project management skills. Their investigation delved into effective practices enabling educators to orchestrate and manage student development initiatives more efficiently, ultimately fostering an environment promoting comprehensive student growth and learning.

Conducting a thorough literature review on these vital topics and developing content into learning modules for an online self-training program will give educators a well-rounded understanding. This enriched knowledge base will empower them to implement classroom learning outcomes effectively.

4. Conclusion and Recommendations

The research into enhancing the professional capacities of educators at the Early Childhood Development Center underscores the critical importance of fostering collaborative learning environments. By harnessing the supportive initiatives of the "Online Self-Training Program for Developing Teachers," educators gain valuable tools and resources to uplift their pedagogical skills, promote leadership, and achieve meaningful learning outcomes. The focus on intertwining Knowledge and action illustrates a paradigm shift necessary for effective professional development in today's educational landscape.

The findings confirm that knowledge alone is insufficient; a concerted effort must be made to facilitate its application in real-world environments. The results urge educational leaders and policymakers to prioritize frameworks that enable educators to translate knowledge into actionable strategies. The research shows that empowering teachers through a community of practice cultivates their skills and significantly enhances student outcomes.

In light of these findings, several recommendations can be made.

1. Implement Structured Collaborative Learning Opportunities: Educational institutions should institutionalize regular interaction among educators, fostering opportunities for peer observation, feedback, and joint problem-solving. This collaboration will enable teachers to engage actively with one another, share best practices, and cultivate a sense of community.

2. Integrate Technology-Enhanced Learning Modules: To address the challenges posed by outdated methodologies, centers should leverage technology to deliver engaging, accessible learning modules that cater to diverse teaching needs and styles. These digital resources should be continuously updated based on emerging educational research and practice.

3. Empower Teacher Leaders: Institutions can assist teachers in taking ownership of their professional development by establishing leadership roles within the educator cohort. Providing mentorship and leadership training will enhance their skills and inspire a culture of self-directed learning and accountability.

4. Cultivate an Evidence-Based Culture: Building a culture that emphasizes using data and insights from credible sources will empower educators in their decision-making processes. Centers should support educators in utilizing research findings to adapt their teaching methods, fostering continuous improvement while enriching their practice.

5. Promote Continuous Feedback Mechanisms: Regular, constructive feedback on teaching practices is vital for professional growth. Schools should implement systematic evaluation processes that include self-reflection and peer

reviews to support educators in honing their skills.

6. Ensure Equitable Access to Resources: As many Early Childhood Development Centers operate in rural areas, it is vital to ensure that all educators have equal access to high-quality learning resources and training opportunities. This could involve partnerships with educational organizations committed to supporting underserved regions.

By following these recommendations, educational organizations can create enriching environments that improve the professional capacities of educators and enhance the educational experiences for all students, effectively preparing them for a future rooted in knowledge and action.

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