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Developing a Process Quality Management Model for Early Childhood Education

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Abstract: This research introduces a fresh perspective by developing a quality management model designed to enhance the internal capacity of Early Childhood Education (ECE) institutions through the empowerment of teachers, principals, and other educational staff. The goal is to shift the focus of quality management from being a purely administrative task to a more self-sustaining, internally driven process. The study employed a modified Borg and Gall Research and Development (R&D) model, including preliminary studies, design, expert validation, and model revision. Data were collected through interviews, observations, and document analysis at ECE institutions in Parepare City, Indonesia. The model is practical, easy to implement, and has high content validity. The findings indicate that the developed model consists of five core components: learning planning, learning implementation, internal supervision, educator professional development, and continuous improvement strategies. This model strengthens ECE institutions' internal capacity for continuous quality management and is recommended for adaptation across various ECE contexts. It offers a process-based approach that aligns with national standards and international best practices, making it adaptable for developing countries. The model's flexibility and focus on local contexts provide valuable insights for improving ECE practices and informing education policy globally. The contribution of this research lies in offering a practical and sustainable framework for ECE institutions to manage and improve quality, with a focus on internal empowerment and contextual adaptation.

Keywords: ECE, Quality Management, Internal Empowerment, Supervision, Learning Model

1. Introduction

The foundation of a child's development lies in their education, in this case, early childhood education (ECE) (Oberhuemer, 2005). Only in a few developing countries does ECE face challenges such as limited sources and infrastructure, weak management, lack of funding, and a lack of parental involvement in monitoring children's development (Hannaway *et al.,* 2019). In addressing these challenges, the role of teachers is crucial, as interactions between teachers and children can foster social skills and foster academic interests (Cimino *et al.*, 2025). This clearly demonstrates that to truly improve the quality of ECE, a learning environment oriented toward strengthening teacher-child interactions can significantly enhance a child's learning experience (Kuswara *et al.,* 2025).

However, many early childhood education institutions, particularly in Indonesia, focus on external evaluation of learning quality management and tend to neglect the internal aspects of early childhood education. Yet, implementing an internal quality management system has been shown to improve education quality and encourage sustainable change (van Elsen, Buckers, Van Tricht, Torbeyns, *et al.,* 2025). Various other studies also show that institutions that use a quality management system oriented towards internal empowerment and a sustainable mindset can improve the quality of the institution (Ho & Chen, 2013; Ho & Lee, 2016; Nores & Fernandez, 2018). Only by strengthening internal oversight can we hope to create a truly high-quality ECE system.

Many studies have highlighted that teacher-child interactions can significantly develop children's cognitive, social, and emotional well-being in early childhood education (ECE) (Davis, 2003; Tilbe & Gai, 2022; Vandenbroucke *et al.,* 2018; Yang & Nasri, 2024). Other studies have shown that, using tools such as the Early Childhood Environment Rating Scale (ECERS), which assesses internal quality rather than external aspects, the quality of

teaching has a far greater impact on child development than structural factors such as the teacher-child ratio in an ECE institution (Sylva *et al.,* 2006). The quality of teacher-child interactions has been shown to foster high-quality learning experiences (Mashburn *et al.,* 2008). In fact, the way teachers manage the learning process and interact with children during these interactions appears to be closely linked to the overall quality of education (R. Pianta *et al.,* 2005). One compelling case study is research conducted in South Africa, where a community-based approach and local empowerment were adopted to improve Early Childhood Education (ECE) standards. This model demonstrates that improving education quality is not simply about refining teaching strategies—it also involves leveraging local resources and perspectives to create sustainable improvements (O'keeffe *et al.,* 2022).

Numerous studies have explored the various factors that affect the quality of early childhood education (ECE), with many focusing primarily on measuring quality or analyzing its influencing elements (Burchinal, 2018; Melhuish & Gardiner, 2019; Von Suchodoletz *et al.,* 2023). However, a significant gap in the literature is the absence of an internal empowerment-based quality management model that could be directly implemented within ECE institutions. While existing research acknowledges the importance of such models, it often overlooks how an internal, locally tailored approach could drive more sustainable improvements. Research suggests that internal empowerment systems are capable of generating changes that are not only more relevant but also more adaptable to local contexts (Ho & Chen, 2013; Ho & Lee, 2016; Nores & Fernandez, 2018; van Elsen, Buckers, Van Tricht, & others, 2025). That said, much of the current body of work continues to focus on external measures of ECE quality management (Sheridan, 2000; Wehachart, 2024; Wong & Li, 2010). To address this gap, the present study aims to develop a quality management model based on internal empowerment that can be customized to the specific needs and conditions of ECE institutions in developing countries.

This research introduces a fresh perspective by developing a quality management model designed to enhance the internal capacity of ECE institutions through the empowerment of teachers, principals, and other educational staff. The goal is to shift the focus of quality management from being a purely administrative task to a more self-sustaining, internally driven process. In addition, this study proposes a new way of visualizing the quality cycle, making it more accessible and easier to implement across ECE institutions in various developing countries.

The contribution of this research lies in its potential to create a more sustainable and independent approach to quality management in early childhood education. The proposed model aims to strengthen the capabilities of ECE institutions, fostering long-term improvements in the quality of education. By incorporating a process-based approach that aligns with both national standards and international best practices, this model is flexible enough to be adapted to different contexts in developing countries. Moreover, it offers valuable insights that could inform education policy and curriculum development on a global scale.

2. Methods

2.1 Research Design

This study adopted a Research and Development (R&D) approach, utilizing a modified version of the Borg and Gall model (Rahmatin *et al.,* 2025). The research was carried out in four stages. The first stage involved a preliminary study aimed at identifying key problems, needs, and the specific conditions of the field. Based on the results of this needs analysis, the next phase focused on designing a model that addressed these identified issues. To ensure the model's relevance and validity, five experts were consulted to evaluate the design using the Content Validity Index (CVI) and provide feedback. These stages culminated in the development of a model that encapsulated the research findings.

It's important to acknowledge that the number of informants in this study was relatively small, which limits the generalizability of the model. As a result, this research is exploratory in nature. To strengthen the model, future studies should include a larger pool of informants and conduct model testing in Early Childhood Education (ECE) settings with a more diverse sample to validate its effectiveness and applicability.

2.2 Informants and Expert Panel

This study involved two main groups, namely the informant category and the expert panel. Informants include teaching staff and principals in ECE institutions in Parepare City, consisting of 2 Head of Kindergarten and 6 ECE teachers (from various ECE institutions with different accreditation status). Expert Panel: Consists of five people who are competent in the field of education management and early childhood education, with more than 12 years of experience in the field.

As shown in Table 1, the research informants included key educational stakeholders, while the expert panel consisted of experienced professionals in the fields of education management and early childhood education, as presented in Table 2.

Table 1. Research Informants

Informant Initials	Role	Institution
ACH	Preschool teacher	Al-Madinah Integrated PAUD Centre
AT	Kindergarten Teacher	At-Taqwa Kindergarten
IMN	Kindergarten Teacher	Al-Inaniah Kindergarten
IYN	Kindergarten Teacher	Al-Akhwan Kindergarten
MNW	Head of Kindergarten	Putri Ramadhani Kindergarten
NA	Kindergarten Teacher	Nusa Indah Kindergarten
SSR	Head of Kindergarten	IT Bunda Wardah Kindergarten
WM	RA Teacher	RA Ashabul Kahfi

Table 2. Expert Panel

Expert Name	Field of Expertise	Experience (Years)
MZ	Education Management	20
KT	Early Childhood Education	18
RS	Education Management	22
FJ	Early Childhood Education	15
LD	Curriculum Development	25

2.1 Data Collecting and Data Analysis

For this study, qualitative data were gathered through in-depth interviews and observations involving principals, preschool teachers, and ECE supervisors. The analysis followed a thematic approach, adapted from Miles and Huberman's framework, which includes three main stages: data reduction, data presentation, and conclusion drawing (Miles & Huberman, 1984). Essentially, the process begins with data reduction, where we sift through the information and focus only on the most relevant details that relate to the issues identified in the first phase. Once that's done, the data are organized in a clear and structured way to make it easier to digest and analyze. Finally, the researchers synthesize the data to form coherent conclusions based on the patterns and themes that emerge.

On the quantitative side, the Content Validity Index (CVI) was used to assess the validity of the model's content (Masuwai *et al.,* 2024). This index is determined by expert evaluations of the model's relevance, clarity, completeness, and applicability. The scoring system follows a simple scale of 0 and 1, where scores of 1 and 2 are assigned a 0, and scores of 3 and 4 are assigned a 1. This corresponds to the level of relevance, ranging from "not relevant" (1) to "very relevant" (4) (Lynn, 1986; Yusoff, 2019). After the experts' ratings are coded, the Item-Level CVI (I-CVI) for each indicator is calculated using the formula:

$$I - CVI = \frac{Number\ of\ experts\ who\ gave\ a\ score\ of\ 3\ or\ 4}{Number\ of\ experts\ who\ assessed\ the\ item} \quad (1)$$

Next, we calculated S-CVI/Ave, which is the average of the I-CVI of all indicators. S-CVI/Ave was calculated with the formula:

$$S - CVI/Ave = \frac{\sum I-CVI}{Number\ of\ indicator} \quad (2)$$

The S-CVI/Ave offers a snapshot of the overall content validity of the model. An S-CVI/Ave value of 0.90 or higher suggests that the model has excellent validity. Following that, the S-CVI/UA (Universal Agreement) index is calculated to gauge the level of consensus among the experts on the specific index being tested. If every expert rates an index as 3 or 4, the S-CVI/UA value for that index will be 1. However, if there's disagreement among the experts, the value drops to 0.

2.2 Methodological Limitations

There are a few notable methodological limitations in this study. First, the informant pool for the needs analysis was relatively small, consisting of just eight participants—two principals and six teachers—from a single city. This small sample size limits the generalizability of the findings, making it difficult to apply the results to a broader population. While the small number of informants was adequate for developing an initial model, it doesn't allow for a comprehensive understanding of the varied learning processes in early childhood education (ECE), both in Indonesia and internationally. As such, no broad conclusions can be drawn regarding the model's applicability in contexts outside of the study's specific setting. Future research should aim to involve a larger and more diverse group of informants.

Second, the study relied heavily on expert validation, which, while useful for evaluating the content validity of the model, doesn't provide insight into the practical feasibility of the model's implementation or the challenges that users might face. As a result, this research doesn't fully address the difficulties that could arise when attempting to apply the model within an ECE environment. Further testing and real-world implementation in a variety of ECE institutions would be necessary to better assess how the model performs in practice.

Lastly, although this study collected qualitative data through interviews and observations, the addition of quantitative methods would have provided a more well-rounded perspective on the model's effectiveness. While qualitative data is crucial for exploring the deeper dynamics, a mixed-methods approach—one that combines both qualitative insights and quantitative evaluations—could offer a clearer picture of how the model influences learning processes within ECE institutions.

3. Results and Discussion

3.1 Needs Analysis

Based on in-depth interviews with research informants, a number of key issues related to quality management of the learning process were identified. The findings revealed challenges in planning, implementation, supervision and professional development of teachers, as well as the importance of the local context in the learning process. The Table 3 summarises the results of the thematic analysis of the interview data.

Analysis of interview findings reveals that quality management of the learning process in Parepare PAUD has not been internalised optimally. Lesson planning is still not standardised, with variations in RPPH and RPPM formats and inconsistent integration of child development indicators, indicating a weak internal framework. Learning practices also tend to be repetitive and lack innovation, with low utilisation of local materials, although there are some good practices based on culture and religion. Infrequent internal supervision is reactive and focussed on administrative compliance rather than continuous improvement. In addition, teachers' professional development relies on external training, reflecting weak internal development capacity, which risks creating skills gaps among teachers. While cultural and religious values-based initiatives exist, they are not followed by systematic evaluation mechanisms to measure their impact on children's development.

This finding is in line with the results of studies showing that the quality of learning in early childhood education is influenced more by the quality of teacher-child interactions and teaching strategies than structural factors such as teacher-child ratios or years of study (Howes *et al.*, 2008; R. Pianta *et al.*, 2005). The weaknesses in

internal supervision of ECE in Parepare, Indonesia, align with research emphasizing the importance of teacher-to-teacher interaction as a primary predictor of children's academic and linguistic development (Mashburn *et al.,* 2008). However, this has not been optimally achieved due to the lack of process-based assessment tools (Sylva *et al.,* 2006).

Table 3. Needs Analysis

Main Theme	Description of Findings	Sample Interview Quotes
Learning Planning	RPPH/RPPM format varies, integration of child development indicators is not consistent, some are not in line with the latest curriculum.	*"Formulation of lesson plans... sometimes 2013 curriculum, sometimes independent..."* (IMN) *"Learning objectives from the school's vision and mission... but the materials do not fully support it."* (ACH)
Learning Implementation	The learning process tends to be routine, limited innovation, purchased media, minimal utilisation of local materials.	*"Learning implementation... routine, media mostly purchased."* (WM) *"Reciting the Quran every day, speaking Bugis on certain days."* (IMN)
Internal supervision	Supervision is conducted before accreditation, unscheduled, formal instruments are rarely used.	*"Supervision is usually before accreditation..."* (MNW)
Teacher Professional Development	Depending on external training invitations, there is no ongoing internal programme.	*"Teacher development depends on training invitations..."* (SSR)
Contextualising learning	lesson plans are adapted to the school environment and existing media sources, focusing on behavioural habituation.	*"Lesson plans refer to basic competencies, adjusted to the surrounding environment."* (NA) *"Our focus is more on behavioural habituation such as social-emotional and religious values."* (AT)

Source: Researcher's Data Processing

The results also reinforce the concept of *continuous improvement*-based education quality management (Mahfuzhah, 2018), where quality should be built on strong planning, innovative implementation, effective supervision and continuous professional development. However, the findings also indicate that the theory needs to be adapted to the Indonesian PAUD context, where local cultural factors and religious values are an important part of the learning design (Jaya *et al.,* 2024). Thus, the quality management model developed needs to incorporate elements of *context-based quality improvement*, integrating national standards with local potential to create relevant, quality learning.

3.2 Model Design

The results of the needs analysis form the basis for designing a Quality Management Model for PAUD Learning Processes based on Internal Empowerment. The model integrates field findings, education quality management theory (Anderson *et al.,* 1994; Aniskina & Terekhova, 2019; Crawford & Shutler, 1999; Dahlgaard-Park *et al.,* 2018; Tarí & Dick, 2016), and international practice on *process quality* in early childhood education (Tietze *et al.,* 1996; Tobin, 2005; Ulferts *et al.*, 2019). The design of the model begins with identifying the core principles: integration of planning-implementation-evaluation as a continuous quality cycle, empowerment of internal actors (principals and teachers), integration of local and national values in learning design, and flexibility of implementation according to institutional capacity. Based on these principles, the model includes five key components: Learning Planning to address variations in formats and indicators, Learning Implementation that emphasises innovation and the use of local media, Internal Supervision and Monitoring based on simple and routine instruments, Educator Professional Development to reduce dependency on external training, and Continuous Improvement Strategies that ensure follow-up evaluation. Each component is equipped with performance indicators according to SNP Process

Standards and international best practices, with the aim of creating a model that is operational, measurable and contextualised. Table 4 lists the model components and problems addressed.

Conceptually, this model builds on the principle of continuous improvement in educational quality management, a framework supported by various scholars (DHJM *et al.,* 2003; Hogg & Hogg, 1995; Mahfuzhah, 2018; Ridwan & Hamdanah, 2025). In this model, both school administrators and teachers are positioned as central figures in driving quality improvements.

Table 4. Model Components and Problems Addressed

Model Components	Main Problem	Approach in the Model
Lesson Planning	Variations in RPPH/RPPM format, incomplete indicators	Standardised format based on Merdeka Curriculum + guidance on integration of child development indicators
Learning Implementation	Routine methods, limited learning media	Active & creative learning strategies, environment-based media utilisation
Internal Supervision & Monitoring	Reactive supervision, without standardised instruments	Routine supervision based on simple instruments & focus on the process
Educator Professional Development	Reliance on external training	Continuous internal development programme (workshops, mentoring)
Continuous Improvement Strategy	No follow-up on evaluation results	Measurable improvement action plan from supervision results

Source: Researcher's Data Processing

This focus aligns with findings from research that highlights the significance of concentrating on learning content and teaching practices (Burchinal, 2018). Moreover, it resonates with studies that underscore the critical role of teacher-student interactions as a key factor in student success (Mashburn *et al.,* 2008). By aligning each component of the model directly with the issues identified during the needs analysis phase, the design establishes a clear connection between the empirical data and the conceptual solutions. This approach, grounded in R&D-based model design, ensures strong traceability and a solid foundation for the model's effectiveness.

3.3 Expert Validation

The expert validation phase was conducted to assess the suitability and feasibility of the designed PAUD Learning Process Quality Management Model based on Internal Empowerment. Each expert was asked to assess each indicator in the model based on four aspects: relevance, clarity, completeness, and applicability. This assessment was conducted using a 4-point scale (1 = not relevant, 2 = less relevant, 3 = relevant, 4 = very relevant). Table 5 lists the result of I-CVI and S-CVI/Ave.

Table 5. Results of I-CVI and S-CVI/Ave

Model Component	Relevance	Clarity	Completeness	Applicability	S-CVI/Ave
Lesson Planning	1,00	0,80	1,00	1,00	0,95
Learning Implementation	1,00	1,00	0,80	1,00	0,95
Internal Supervision & Monitoring	1,00	0,80	0,80	1,00	0,90
Educator Professional Development	1,00	1,00	1,00	0,80	0,95
Continuous Improvement Strategy	1,00	0,80	1,00	1,00	0,95

Source: Researcher's Data Processing

Although the CVI results indicate that the model has very high content validity, the expert panel provided valuable input for further improvement to make the model more applicable and easily understood by users in the field. One of the main inputs was the simplification of language in the indicators and instruments of the model, to make it more easily understood by PAUD teachers with diverse backgrounds. For example, one education management expert suggested, *"Some technical terms in this instrument need to be adjusted to simpler language that is easily understood by PAUD teachers."*

Another early childhood education expert emphasised the importance of contextualising implementation, suggesting the addition of local resource-based examples. *"In the implementation of learning, examples should be given of how teachers can utilise local media or used items around the school*,"which is very relevant to the condition of resource-limited schools.

In addition, an education management expert suggested that the relationships between the components of the model should be made clearer by adding flowcharts that illustrate the interrelationships between the components. *"The relationship between planning, implementation, supervision, and continuous improvement needs to be visualised to make it clearer for teachers and principals,"* which will facilitate understanding and implementation of the model in the field.

This revision aims to make the model more user-friendly, more applicable, and more relevant to PAUD conditions, so that it will strengthen the acceptance and application of the model by practitioners in various PAUD institutions.

3.4 Model Revision

Based on input from the expert panel and the results of the CVI calculation, the following is a revised PAUD Learning Process Quality Management Model based on Internal Empowerment that is more applicable and in accordance with expert comments, as given in Table 6.

Table 6. Model Revision

Model Component	Main Problems	Approach in Model (Revised)
Learning Planning	Variations in RPPH/RPPM format, incomplete indicators	Standardised format based on Merdeka Curriculum + guidance on integration of child development indicators + simplification of language to be easily understood by PAUD teachers
Learning Implementation	Routine methods, limited learning media	Active, creative & child-centred learning strategies, utilisation of environment-based media, and examples of local and second-hand media
Internal Supervision & Monitoring	Reactive supervision, no standardised instruments	Routine supervision based on simple & process-focused instruments + condensed versions of supervision instruments that can be used without intensive training
Educator Professional Development	Reliance on external training	Continuous internal development programmes (workshops, peer mentoring) based on internal school needs
Continuous Improvement Strategy	No follow-up of evaluation results	Measurable improvement action plans from supervision results and teacher reflections as follow-up to continuous improvement

Source: Researcher's Data Processing

This model can be visualised as follows:

The Process Quality Management Model for Early Childhood Education shows an integrated learning quality management cycle, from planning, implementation, internal supervision & monitoring, educator professional development, to continuous improvement strategies. Figure 1 shows Process Quality Management Model. This cyclic pattern confirms that the quality of the learning process in ECE is a dynamic process that is constantly being improved, rather than a one-way system that ends at evaluation. The meaning behind this data is a paradigm shift from an administrative and reactive pattern of quality management to a proactive, collaborative, internal empowerment pattern based on reflection of real practices. An anomaly that emerges from this cycle is the need for examples of contextual applications and local media that previously escaped the attention of national standards-based quality management, but are now accommodated in a model that is more adaptive to the realities of the ECE field.

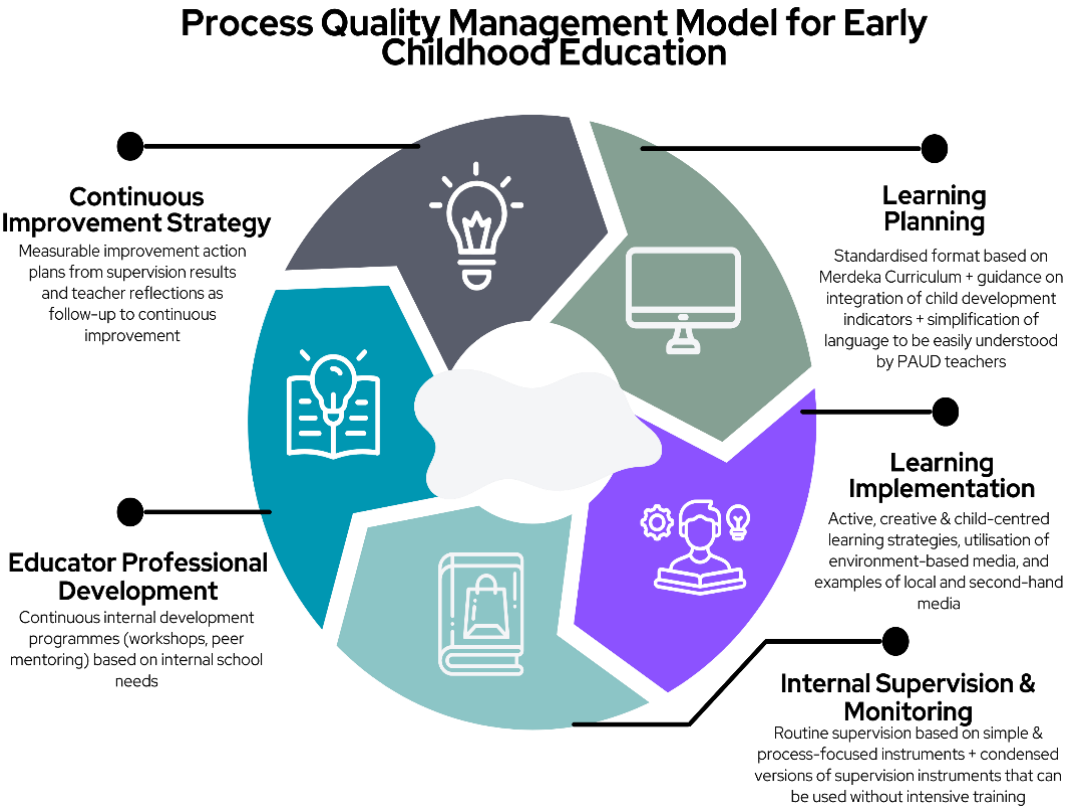

Figure 1. Process Quality Management Model for Early Childhood Education

Source: Created by the author

This finding is in line with research that emphasises the importance of "*process quality*" in improving early childhood learning outcomes - that is, quality management of the learning process that emphasises the quality of interaction (R.C. Pianta & Hofkens, 2023), teacher reflection (Syslová, 2019), and the use of environmental resources (Pereira et al., 2021). Theoretically, this model extends and operationalises the principle of *continuous improvement* in education quality management (MENTEŞOĞULLARI, 2023; Nilsson-Witell *et al.*, 2005). The model not only verifies standards-based quality theory, but also extends it into the contextualised practice of Indonesian PAUD. It provides a bridge between national quality concepts and the innovation needs of the field.

The practical implications of this model are enormous: PAUD centres can build an active quality cycle - from simple planning that teachers can easily understand, to creative and contextualised implementation, to reflective and applicable supervision without excessive administrative burden. With an internal needs-based professional development strategy and continuous improvement that involves teacher reflection, this model can help PAUD institutions with little access to external training to keep improving the quality of their learning. Theoretically, this model enriches the literature on PAUD quality management in Indonesia by presenting an alternative model based on internal empowerment rather than administrative compliance.

One limitation of this study is that the model has not been widely tested in PAUD contexts with different resources and levels of implementation readiness, so further adaptation in different regions may be required. In addition, the model still requires evaluation of its long-term impact on children's developmental outcomes. Further research is recommended to test the effectiveness of this model in different contexts and explore the sustainability of its implementation in the field.

4. Conclusion

This research develops a model for improving the quality management of early childhood education (ECE). The developed model is a cyclical model that can be replicated by ECE providers everywhere. This cycle consists of planning, implementation, internal monitoring, professional development of educators, and a continuous improvement strategy. This model implies that quality evaluation cannot be conducted once or twice but must be dynamic and ongoing, as quality must evolve.

This research contributes to encouraging internal monitoring by leaders, teachers, and other stakeholders to develop sustainable internal quality management. The resulting model can also be adapted by any early childhood education institution.

This research has significant implications for leaders, administrators, and especially policymakers at the government level. For ECE leaders, the cycle in the model findings can serve as a framework for internal oversight. For teachers, the cycle can be adapted for teaching. For policymakers, this model can serve as a foundation for improving the national quality management system.

However, it should be noted that this research has limitations in that the model has not been tested on a larger scale. The research findings stem from the limited number of informants and experts, so further research is needed to refine this model.

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