



## Contextualized Montessori teacher training: A learning impact evaluation

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### ABSTRACT

Early childhood education plays a strategic role in shaping the holistic development of children. However, the implementation of the Montessori approach in Indonesia still faces several challenges, including limited teacher training and a lack of cultural contextual alignment. This study aims to evaluate the impact of a contextualized Montessori teacher training program, which includes limited teacher training and inadequate knowledge improvement among early childhood educators. The research employed a quasi-experimental method with a one-group pretest-posttest design, without a control group. A total of 20 teachers from KB TKIT AsySyaffa 1 Magelang participated in a three-month training program. The impact of the training was measured using Kirkpatrick's Level 2 (learning) evaluation model, with a validated 17-item test instrument. Tests for normality and homogeneity confirmed that the data met the assumptions for parametric analysis. The paired sample t-test revealed a significant difference between pretest and posttest scores, indicating an increase in teachers' knowledge after the training. These findings affirm that contextualized Montessori training effectively enhances teacher understanding and has the potential to strengthen the implementation of the Montessori approach in Indonesia's early childhood education system.

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### ABSTRAK

Pendidikan anak usia dini memegang peran strategis dalam membentuk fondasi perkembangan anak secara holistik. Di sisi lain, penerapan pendekatan Montessori di Indonesia masih menghadapi sejumlah tantangan, seperti keterbatasan pelatihan guru dan kesesuaian dengan konteks budaya lokal. Penelitian ini dilakukan untuk mengukur efektivitas dampak pelatihan guru Montessori yang dikontekstualisasikan terhadap peningkatan pengetahuan guru PAUD sebagai bagian dari evaluasi level 2 model Kirkpatrick. Penelitian menggunakan metode kuasi-eksperimen dengan desain one-group pretest-posttest tanpa kelompok kontrol. Sebanyak 20 guru dari KB TKIT AsySyaffa 1 Magelang menjadi peserta pelatihan yang berlangsung selama tiga bulan. Pengukuran dampak pelatihan dilakukan menggunakan model evaluasi Kirkpatrick level 2 (learning), dengan instrumen tes berisi 17 butir soal validasi. Hasil uji normalitas dan homogenitas menunjukkan data memenuhi syarat analisis parametrik. Uji paired sample t-test menunjukkan adanya perbedaan signifikan antara skor pretest dan posttest, yang mengindikasikan peningkatan pengetahuan guru setelah pelatihan. Temuan ini menegaskan bahwa pelatihan Montessori berbasis kontekstual efektif dalam meningkatkan pemahaman guru dan berpotensi memperkuat implementasi pendekatan Montessori dalam sistem pendidikan anak usia dini di Indonesia.

**Kata Kunci:** evaluasi Kirkpatrick; Montessori; PAUD; pelatihan guru; pembelajaran kontekstual

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## **INTRODUCTION**

*Pendidikan Anak Usia Dini* (PAUD) or early childhood education plays a crucial role in establishing the foundation for a child's holistic development, encompassing cognitive, social, emotional, and physical aspects (Rohmah et al., 2023). During the golden age of child development, defined as the period from birth to six years of age, children possess remarkable potential in cultivating creativity, critical thinking skills, and the formation of good character. During this period, a child's brain exhibits high plasticity, enabling them to absorb various types of information and new skills rapidly (Catherine et al., 2020; L'écuyer & Murillo, 2020). Research emphasizes the importance of a supportive environment for exploration and creativity during this golden age, as these learning experiences play a significant role in shaping a child's future educational trajectory and overall well-being (Jeong et al., 2021; Pattiruhu et al., 2023). Appropriate and effective early childhood education strategies are essential to optimize child development during this crucial formative stage

With the growing global attention on early childhood development, the implementation of evidence-based educational practices that prioritise a holistic approach has become increasingly relevant. The Montessori method is one such educational approach that has been widely recognized as a solution to these needs (Noviani, 2024; Putri & Wahab, 2024). The Montessori method is rooted in an educational philosophy that emphasizes hands-on learning experiences, the development of independence, and guided exploration. This approach places significant emphasis on addressing each child's individual learning needs. A carefully prepared learning environment and the use of Montessori materials specifically designed to facilitate exploration enable children to learn at their own developmental pace (Lillard, 2012; Wahyuningsih et al., 2022). The advantages of this method have been supported by numerous studies indicating that children in Montessori programs tend to demonstrate superior academic achievement, more advanced social skills, and higher emotional intelligence compared to children in traditional learning approaches (Courtier et al., 2021; Lillard et al., 2017).

Although the Montessori Method has been widely adopted globally, its implementation in Indonesia still faces several challenges. A primary obstacle is the insufficient preparedness of teachers to properly understand and apply core Montessori principles, particularly when adapting them to local cultural contexts and needs. Many teachers encounter difficulties integrating Montessori approaches into daily teaching practices due to a fundamental mismatch between Montessori's individualistic principles and Indonesia's collectivist cultural values (Siswanto & Kuswando, 2020). These challenges are further compounded by teachers' limited access to comprehensive Montessori professional training. Additionally, the scarcity of authentic Montessori teaching materials and their high procurement costs present significant barriers, particularly in regions distant from major urban centers or in resource-constrained areas (Latifa et al., 2023; Nuraeni et al., 2019).

These challenges underscore the critical need for relevant and effective education and training programs to enhance Montessori teachers' professional capacity. The successful implementation of Montessori methods fundamentally depends on the competencies of the practicing teachers. Research demonstrates that systematic, high-quality teacher training significantly impacts teachers' ability to effectively adopt and implement new pedagogical

approaches (Wu, 2017). Teacher training represents a strategic measure for addressing various implementation barriers of the Montessori Method, ensuring its effective integration into daily teaching practices while facilitating appropriate cultural and local contextual adaptation. Without adequate training, Montessori implementation risks becoming superficial and failing to deliver optimal benefits for child development (Atis-Akyol et al., 2023).

In response to these challenges, Kamoe! has been conducting teacher training programs focused on Montessori approach integration since 2022 across various educational institutions in multiple Indonesian cities. Among the schools participating in this program, KB TKIT AsySyaffa 1 Magelang serves as a model school. From the several partner institutions collaborating with Kamoe!, KB TKIT AsySyaffa 1 Magelang has been consistently and actively implementing training programs while maintaining openness to ongoing mentoring processes as part of sustainable post-training support. To assess the impact of such training, a comprehensive evaluation must be conducted, including measuring improvements in participants' knowledge, skills, and professional attitudes. This evaluation is crucial to ensure the learning process remains focused on students with diverse needs and characteristics, aligning with one of Montessori's fundamental principles.

The Kirkpatrick evaluation model, which consists of four levels, reaction, learning, behavior, and results can be employed to assess the effectiveness of this training program. At the learning level (Level 2), this evaluation model measures the improvement in teachers' knowledge and skills following the training. On the other hand, Rusman, in his book titled "*Manajemen Kurikulum*," argues that at the behavior level (Level 3), the evaluation focuses on the application of acquired knowledge and skills in actual classroom teaching practices to create a learning environment aligned with Montessori principles. The application of the Kirkpatrick evaluation model at both the learning (Level 2) and behavior (Level 3) levels proves highly effective in assessing the impact of training. Furthermore, this evaluation method is particularly effective for measuring the enhancement of teachers' pedagogical competencies after completing the training program (Mahmoodi et al., 2019; Moldovan, 2016).

As previously discussed, the establishment of the Kamoe! institution to provide Montessori-related training has been in place since 2022. However, to date, there has been limited systematic research measuring the effectiveness of this training, particularly regarding its impact on improving teachers' understanding of core Montessori philosophy. Therefore, this study aims to measure and analyze the effectiveness of Montessori teacher training, specifically contextualized in terms of its contribution to enhancing early childhood education (PAUD) teachers' knowledge. This effectiveness measurement is conducted as part of the Level 2 evaluation within the Kirkpatrick model framework, assessing knowledge acquisition resulting from the training. The effectiveness test serves to verify that the training process genuinely enhances teachers' conceptual understanding rather than functioning as merely a ceremonial activity.

## LITERATURE REVIEW

### Kirkpatrick Evaluation Impact in Education and Training

Evaluation constitutes a systematic process for assessing a program's effectiveness in achieving its intended objectives, ultimately yielding accountable decision-making outcomes (Yustikarini, 2023). According to Rusman in his book "*Manajemen Kurikulum Pendidikan dan Pelatihan: Konsep, Pengembangan, dan Evaluasi*", evaluation in education and training comprises two primary types: formative evaluation conducted during program implementation to provide feedback for continuous improvement, and summative evaluation carried out after program completion to assess overall program success and resulting impacts (Piliano et al., 2023). Furthermore, evaluation is essential to ensure the attainment of desired outcomes by assessing key success indicators, including improvements in knowledge, skills, and attitudes (Kurniawati, 2023).

In this study, the Kirkpatrick evaluation model was employed to assess the effectiveness of the education and training program due to its demonstrated efficacy in evaluating teacher training initiatives (Moldovan, 2016). According to Kirkpatrick's explanation in his book "*An Introduction to The New World Kirkpatrick*", this model consists of four interconnected levels (see **Figure 1**), namely:

1. Reaction: Measures participant satisfaction with training components, including content, methodology, and facilitator effectiveness.
2. Learning: Assesses acquired knowledge, skills, or attitude changes during the training period.
3. Behavior: Evaluates application of training outcomes in authentic work environments or practical situations.
4. Results: Examines the training's organizational or community-wide impact.



**Figure 1.** Interrelationships Among Kirkpatrick Evaluation Model Levels  
*Source: Adapted from Researcher Documentation, 2025*

According to Tamkin in the book "*Kirkpatrick and Beyond: A review of modes of training evaluation*" the Kirkpatrick evaluation model at the behavior level (Level 3) and results level (Level 4) provides profound insights into a training program's effectiveness in generating meaningful change. Within the context of early childhood (PAUD) teacher training, this model proves particularly relevant as it offers a comprehensive perspective on training effectiveness, not merely in terms of immediate reactions but also regarding practical implementation changes and their ultimate impact on students.

## **The Montessori Approach in Education**

The Montessori Method is an experience-based educational approach designed to support holistic child development by centering the child as the focal point of learning (Colgan, 2016; Usman & Azizah, 2024). Children educated in Montessori environments demonstrate superior achievement in creativity, problem-solving skills, and emotional regulation compared to those in traditional learning settings (Azhari et al., 2024; Courtier et al., 2021). This approach emphasizes self-directed exploration, hands-on experiential learning, specially designed instructional materials, and a structured learning environment. The Montessori setting creates opportunities for children to engage in profound learning through direct interaction with didactic materials, as each child possesses an innate potential for learning when provided with developmentally appropriate freedom (Lillard et al., 2017). The core principles of the Montessori approach encompass several key aspects:

1. Independence: Children are granted the freedom to choose activities and explore according to their interests.
2. Experiential Learning: Children are encouraged to learn through direct interaction with developmentally appropriate materials.
3. Prepared Environment: All elements within the learning environment are intentionally designed to support self-directed learning.
4. Teacher's Role: Educators serve as facilitators who guide children in discovering their potential without dominating their learning process.

## **Implementing Kirkpatrick Evaluation in Montessori Teacher Training and Its Challenges**

Montessori-based early childhood (PAUD) teacher training in Indonesia requires contextual design that accounts for local values, facility limitations, and learner characteristics (Wu, 2017). Practice-based training, including simulations of teaching material usage, child observation exercises, and classroom environment design has proven effective in enhancing teachers' readiness to implement Montessori methods while cultivating reflective and adaptive skills. This approach is crucial for bridging the gap between Montessori philosophy's ideals and the realities of early childhood education in practice, ensuring teachers not only grasp theoretical concepts but can also effectively apply them within local contexts (Moldovan, 2016). The implementation of the Montessori method in Indonesia faces several challenges, including limited access to authentic teaching materials, insufficient teacher training, and high associated costs (Siswanto & Kuswando, 2020).

The disparity stems from unequal access to quality Montessori training, which is typically limited to major urban areas (Latifa et al., 2023). Additionally, several adaptations are required to effectively integrate the Montessori method into Indonesia's collectivist cultural context, where traditional educational paradigms remain prevalent (Raghuraman & Tischler, 2021). The Kirkpatrick evaluation model serves as the framework for assessing teacher competency development to ensure training effectiveness, particularly at the learning (Level 2) and behavioral change (Level 3) levels. The evaluation focuses on theoretical understanding, practical skills, and post-training attitudes through pre-tests, post-tests, and

simulations. This initiative represents part of the effort to address Montessori implementation challenges in Indonesia, including limited access to training, teaching materials, and the need for adaptation to local culture and traditional educational paradigms. The evaluation results are expected to contribute to developing more relevant, effective, and sustainable teacher training programs. However, the research conducted in this journal article specifically focuses on evaluating teachers' theoretical understanding of Montessori principles after training through pre-tests and post-tests. **Table 1** presents the evaluation indicators and methods based on the Kirkpatrick model for Montessori teacher training.

**Table 1.** Indicators and Evaluation Methods Based on the Kirkpatrick Model

Evaluation Level	Evaluation Indicators	Evaluation Methods
Level 2: Learning	Understanding of Montessori theory, proficiency in utilizing instructional materials.	Tests, group discussions, simulations.

*Source: Research (2025)*

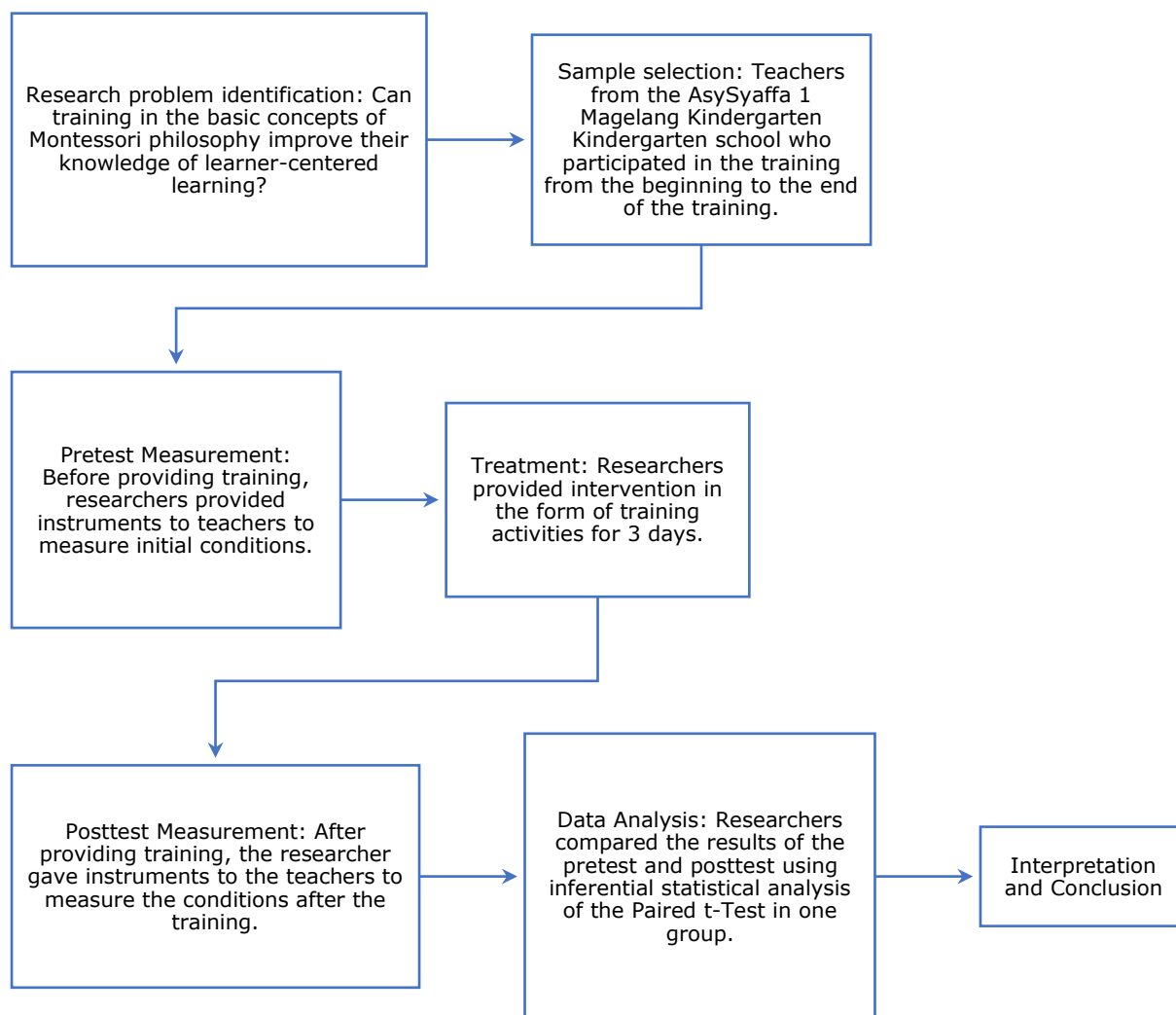
## METHODS

This study employed a quasi-experimental method involving a single group of teachers without a control group. The research design utilized was a one-group pretest-posttest approach to measure participants' knowledge before and after the training and analyze score changes between the pretest and posttest. The sampling technique applied in this study was total sampling, where the entire population served as the sample. This study involved 20 teacher participants in a training program conducted at KB TKIT AsySyaffa 1 Magelang. The training focused on integrating and contextualizing the Montessori approach within Indonesian educational settings and spanned three months from April to June 2024. The quasi-experimental method with a one-group pretest-posttest design was selected because this study does not involve a comparison class serving as a control group to examine differences in training outcomes. The research design is formulated as follows (see **Figure 2**).



**Figure 2.** One-Group Pretest-Posttest Design  
*Source: Adapted from Researcher Documentation, 2025*

The questions administered to participants in both the pretest and posttest were identical. The assessment consisted of 17 validated items that had undergone expert review, confirming their suitability as evaluation instruments. These questions were designed to measure performance differences before and after teachers completed the training program. The study followed the procedural stages outlined in **Figure 3** below:



**Figure 3.** Research Implementation Procedure  
*Source: Researcher Documentation, 2025*

The research implementation procedure (as shown in **Figure 3**) consists of several systematic stages, beginning with training planning, specifically the development of the training design and evaluation instruments. Subsequently, a pretest is administered to assess participants' baseline knowledge of Montessori principles. Following this, participants underwent a three-month Montessori teacher training program, implemented in a structured and practice-oriented manner while being adapted to the local context. Upon completion of the training, a posttest was administered using identical assessment instruments to measure changes in participants' knowledge levels. All pretest and posttest data were then quantitatively analyzed using statistical methods, specifically paired sample t-tests, to evaluate the training's impact on enhancing teachers' understanding. This procedure was designed to ensure the training was not merely delivered but also had its effectiveness measured objectively and systematically.

## RESULTS AND DISCUSSION

### Results

#### Testing Prerequisites for Montessori Training Effectiveness

Prior to conducting difference tests using paired sample t-tests, normality testing was required to verify that the data followed a normal distribution, as mandated for parametric analyses. This study employed the Shapiro-Wilk test for normality assessment, as the sample size was fewer than 50 respondents ( $N = 20$ ). The Shapiro-Wilk test represents one of the recommended methods for evaluating small to moderate-sized datasets due to its superior statistical power compared to the Kolmogorov-Smirnov test (Hanusz & Tarasińska, 2015; Mishra *et al.*, 2019).

**Table 2.** Normality Test Using Shapiro-Wilk

Score	Shapiro Wilk		
	Statistic	df	Sig.
Pretest	0,956	20	0,464
Posttest	0,958	20	0,714

*Source: Research (2025)*

Based on the results presented in **Table 2**, the significance values for both the pretest scores (0,464) and posttest scores (0,714) exceed 0,05. As Field explains in his book "*Discovering Statistics Using IBM SPSS Statistics*" this indicates that both sets of score data are normally distributed, thereby satisfying the normality assumption. Consequently, parametric analysis can be appropriately employed for further testing. Subsequently, a homogeneity test was conducted to examine variance equivalence between pretest and posttest data. This analysis was performed using SPSS software by comparing the significance value against the 0,5 threshold. The homogeneity test results are presented in **Table 3**.

**Table 3.** Homogeneity Test

Result	Shapiro Wilk		
	Statistic	df	Sig.
Based on Mean	1,498	20	0,229
Based on Median	1,289	20	0,263

*Source: Research (2025)*

Based on the results in **Table 3**, the significance value of Levene's Test for equality of variances (based on mean) is 0,229 ( $> 0,05$ ). This indicates no statistically significant difference in variances between the pretest and posttest data, thus confirming the homogeneity assumption. With both normality and homogeneity assumptions satisfied, the data meet the necessary prerequisites for conducting further parametric analysis using paired sample t-tests (Ghasemi & Zahediasl, 2012; Kim, 2015). The subsequent step involved analyzing the pretest and posttest scores to examine the relevance and statistical

significance of differences following the intervention of a contextualized Montessori training program administered to the sample.

### Evaluating the Effectiveness of Montessori Training

After confirming that the data were normally distributed and homogeneous, the next step involved conducting a paired sample t-test to determine whether there were statistically significant differences between pretest and posttest scores. This test was used to measure the effectiveness of teacher training in enhancing knowledge of the Montessori approach by examining score differences before and after the intervention within the same group.

**Table 4.** Pretest and Posttest Correlation Analysis

Result	N	Correlation	Sig.
Pretest & posttest	20	0,245	0,298

Source: Research (2025)

The correlation analysis results (see **Table 4**) revealed a significance value of 0,298 between pretest and posttest data. Since this significance value exceeds 0,05, the findings indicate no statistically significant relationship between the two variables, pretest and posttest scores.

**Table 5.** One Group Paired Sample T-Test

Result	Standard Deviation	T	Sig.
Pretest & posttest	19,779	-5,065	0,000069

Source: Research (2025)

**Table 5** shows a sig. (2-tailed) value of 0,000069, indicating  $p < 0.05$ . This result allows us to conclude that there is a statistically significant difference between pretest and posttest scores. The training provided demonstrably produced a measurable impact on early childhood (PAUD) teachers' knowledge of Montessori philosophy and fundamental principles.

### Discussion

These findings support the use of practice-based training approaches with local contextualization as an effective strategy for strengthening teachers' competencies in Montessori methodology. The contextualization of the Montessori approach was achieved by adapting learning processes to children's cultural contexts, making materials more relevant and engaging for them. This fosters children's natural interest in learning and exploration (Abiodun, 2024; Gentaz & Richard, 2022). The significant score increase demonstrates that the three-month training program effectively produced positive cognitive changes, as emphasized in Kirkpatrick's Level 2 (Learning) evaluation model. These findings align with Level 2 training evaluation theory, which assesses participant knowledge and skill enhancement as key indicators of learning success (Tamsuri, 2022). The significant improvement in early childhood (PAUD) teachers' understanding of Montessori philosophy,

encompassing independence, prepared environments, and experiential learning demonstrates meaningful professional growth (Lillard et al., 2017).

The implementation of multisensory training approaches also aligns with constructivist principles that can effectively support developmental needs (Aprilliana et al., 2024). Ultimately, this training has significant implications for implementing the Montessori method, which fundamentally emphasizes experiential learning that supports cognitive and emotional growth making it a sustainable educational approach (Leuwol et al., 2023; Mutmainna et al., 2024). A similar study conducted in France corroborates these findings. The research demonstrated that structured, practice-oriented Montessori teacher training enhanced teachers' capacity to create learning environments aligned with Montessori principles, subsequently benefiting children's social and cognitive development (Courtier et al., 2021). In Indonesia, this training has demonstrated particular relevance by successfully harmonizing local values with Montessori's characteristically individualistic approach, highlighting the crucial role of cultural adaptation in implementing Montessori across diverse national contexts (Raghuraman & Tischler, 2021). Moreover, such training also benefits children with special needs by enhancing cognitive abilities and self-care skills (Afshan et al., 2024).

The training program conducted in this study was implemented within a limited duration of three months. Nevertheless, it yielded positive impacts on teachers' knowledge, demonstrating that structured training can effectively enhance teachers' theoretical understanding of new instructional methods (Mahmoodi et al., 2019; Wu, 2017). Furthermore, these findings support the premise that effective training should encompass not only knowledge transfer but also value internalization and reflective skill development (Colgan, 2016). The three-month training program conducted by Kamoe! appears to meet these criteria, as evidenced by consistent knowledge gains among teachers with diverse professional backgrounds.

Additionally, the correlation analysis in this study yielded a significance value of 0,298 (> 0,05), indicating that teachers' knowledge score improvements were independent of their baseline scores. This suggests the training had an equitable impact across participants with varying initial knowledge levels. These results demonstrate that training outcomes were not contingent upon prior knowledge but rather on the inclusive implementation approach that effectively engaged teachers at diverse readiness levels. The findings confirm that systematically designed professional training can robustly enhance both theoretical understanding and pedagogical practice among teachers (Mahmoodi et al., 2019; Wu, 2017). The implementation of such training and professional development programs enables teachers from diverse backgrounds to continuously grow and develop deeper professional competencies.

This study also emphasizes the critical need to adapt training to local cultural contexts. The individualistic foundations of the Montessori approach require alignment with Indonesia's collectivist culture to ensure widespread acceptance and implementation (Siswanto & Kuswando, 2020). This training provides not only conceptual understanding but also implementation strategies aligned with local values and norms. Furthermore, these results reinforce the effectiveness of the Kirkpatrick Level 2 evaluation model in assessing teacher training. At this level, it is crucial to verify that participants have genuinely acquired

applicable knowledge. This aligns with Level 2 evaluation's capacity to predict the success of teacher training programs, particularly when combined with validated instruments and quantitative assessment methods such as pretest-posttest designs (Mahmoodi et al., 2019).

The implications of these findings hold particular significance for early childhood (PAUD) teacher capacity building in Indonesia. Amidst the transition toward more holistic, child-centered early learning approaches, such training programs become pivotal. Successful Montessori implementation depends on teachers' readiness to shift from instructional roles to facilitator roles, a transformation achievable only through comprehensive, sustained professional development (Atis-Akyol et al., 2023). This finding holds not only local relevance but also contributes to global discourse on early childhood (PAUD) teacher professionalism through alternative approaches like Montessori. Long-term evaluation at the behavior and results levels (Kirkpatrick Levels 3 and 4) remains necessary in subsequent studies to determine the extent to which this knowledge is effectively applied and impacts children's learning outcomes.

## CONCLUSION

The locally contextualized Montessori teacher training has proven effective in enhancing early childhood (PAUD) teachers' understanding of Montessori philosophy and fundamental principles, as demonstrated by the significant difference between pretest and posttest scores based on evaluation using the Kirkpatrick Level 2 model. Consistent with the study's objective of evaluating the training's impact on enhancing teachers' knowledge through effectiveness analysis and testing, the results demonstrate that the three-month training program which designed systematically, practice-based, and relevant to the context of early childhood education (PAUD) in Indonesia delivered tangible contributions to strengthening teachers' professional competencies. This training not only expanded conceptual understanding but also equipped teachers with practical tools to meaningfully implement the Montessori approach in classroom practice. These results establish a foundation for developing more sustainable and adaptive teacher training programs while creating opportunities for further evaluation at the behavior and results levels to assess long-term impacts on children's learning processes and outcomes.

## AUTHOR'S NOTE

The authors declare no conflicts of interest regarding the publication of this article. The authors affirm that all data and article content are free from plagiarism.

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