

Technology-Supported Attachment Techniques in Education: A Survey of Teachers' Practices and Needs

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Abstract—This study investigates teachers' understanding, application, and perceived effectiveness of attachment techniques in inclusive schools in West Sumatra, with particular attention to technology-supported professional development. A quantitative survey design was employed to examine teachers' practices, awareness, and challenges related to attachment-based approaches in inclusive education. Data were collected from 30 primary and secondary school teachers using an online questionnaire and analyzed using descriptive statistics. The findings indicate that although a majority of teachers (62.1%) recognize the importance of attachment-based strategies, more than half (58.6%) report limited comprehension, suggesting a persistent knowledge gap in socioemotional pedagogy. While 51.7% of teachers regularly apply attachment techniques in their classrooms, only 37.9% perceive them as highly effective. This reflects inconsistent implementation influenced by insufficient training, time constraints, limited access to professional development opportunities, and inadequate institutional support. The results also reveal strong demand for e-modules (93.1%) and blended learning formats, highlighting teachers' preference for flexible, technology-supported professional learning. Furthermore, administrative leadership and supportive school policies were identified as key factors in sustaining the effective integration of attachment-based practices. Schools that provide adequate resources and encouragement enable teachers to develop stronger relational competencies and instructional adaptability. Overall, the study emphasizes the importance of embedding attachment principles within digital professional learning ecosystems to enhance teachers' socioemotional competencies and inclusive teaching practices. By integrating e-learning tools, peer collaboration, and institutional support, education systems can foster emotionally supportive and technologically empowered teachers who are better equipped to address diverse student needs. Future research should involve larger samples and longitudinal designs to further develop and evaluate digital frameworks for teacher professional development.

Keywords—Attachment techniques; inclusive education; e-modules; technology-enhanced learning; teacher professional development.

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I. INTRODUCTION

Attachment theory offers a valuable framework for understanding the complex dynamics of relationships in educational settings, particularly how emotional bonds between students and caregivers influence socioemotional adjustment and learning. Recent research continues to highlight the applicability of attachment theory in explaining socioemotional processes within inclusive classrooms, showing that secure relationships remain a consistent predictor of students' engagement and emotional resilience across educational levels [1], [2]. Moreover, students with secure attachments to their parents tend to exhibit better socioemotional adaptive

functioning in school. These students often demonstrate fewer behavioral problems, which in turn fosters a more conducive learning environment [3], [4], [5], [6]. Furthermore, emerging evidence suggests that the quality of teacher–student emotional bonds can protect students' well-being, particularly by mitigating feelings of isolation and improving classroom belonging [2], [7]. In this context, teachers act as secondary attachment figures: by being emotionally available, responsive, and consistent, they can significantly shape students' emotional and social development.

Over the past two decades, many studies have explored how the quality of teacher–student relationships influence student adaptation to school. Findings indicate that when teachers

provide emotional support, students are more likely to engage cooperatively in classroom activities, develop higher academic competence, and feel a greater sense of belonging [5], [8]. In addition, teacher–student relational competence has been identified as a learnable skill that can be enhanced through reflection and professional training [9]. Supportive classroom relationships not only enhance academic outcomes but also promote healthier peer interactions, lower anxiety, and improved behavioral regulation.

Moreover, recent work grounded in attachment and educational psychology has found that the emotional dimension of teacher–student relationships (such as empathy, closeness, shared intentionality) often shows stronger links to student outcomes in inclusive settings than solely didactic or instructional factors. For example, a study of inclusive secondary schools found that emotional resonance and shared intentionality significantly predicted relationship quality and, in turn, student adaptation [10]. Similarly, for students with special educational needs, quality teacher–student relationships are positively associated with engagement and inversely related to disengagement, underscoring the relational dimension as a key lever [11].

Despite these insights, relatively few studies have explicitly addressed how teachers conceptualize and enact “attachment-based” relational practices in inclusive classrooms, nor how professional development supports these relational competencies. This gap is critical, given that relational competence may require training distinct from purely academic or behavioral management strategies [12]. Parallel research has also highlighted the rise of digital and blended professional development modules as promising tools to equip teachers with socio-emotional and relational pedagogies, especially in diverse and inclusive learning contexts. Nevertheless, access, quality, and alignment with relational outcomes remain uneven [13].

Despite the established importance of teacher–student relationships, there remains a notable gap in the literature regarding students with disabilities (e.g., learning disabilities, ADHD). These students often face additional socioemotional challenges that can interfere with academic success and well-being, making the role of the teacher–student attachment even more critical [11], [14], [15]. By understanding how teachers perceive and enact attachment-like relationships, especially for students with special needs, educators can tailor support more effectively.

Recent scholarship has begun to address related themes: for example, The teacher-student relationship in inclusive contexts: the role of mentalization and closeness [16] examines how closeness and emotional awareness between teachers and students affect inclusive classroom environments. Another study [17], [18], [19] synthesizes how teacher–student relationships over time are linked to both academic engagement and achievement, particularly for vulnerable students. These works affirm that emotional and relational dimensions are central. Still, they also point to another emerging need: structured training and digital support to help teachers build, maintain, and adapt these relationships under varying classroom demands.

In this regard, recent analyses emphasize that effective professional development should integrate relational pedagogy with digital literacy, ensuring that technology

enhances, rather than replaces, the human connection between teachers and students [20]. In parallel, evidence suggests that leveraging technology in teacher professional development can help close the gap between knowledge and practice. For instance, Archundia-Sierra [21] demonstrates that when teacher training tools are mediated by information and communication technologies (ICT), teachers perceive them as usable and beneficial in inclusive settings. The intersection of attachment theory, inclusive education, and digital/technological training, therefore, offers promising pathways for enhancing socioemotional support in classrooms.

Given the complexity and heterogeneity of student needs in inclusive settings, digital modules may provide scalable opportunities for teachers to reflect on their relational practices, monitor their emotional responsiveness, and receive feedback on relational quality, thus operationalizing attachment-informed practices in everyday teaching.

The present study aims to build on this evolving field by surveying 30 teachers in primary and secondary schools to examine their awareness of and implementation of attachment techniques, with a particular focus on their perceived need for technology-supported resources, such as e-modules. Specifically, this research will explore: (1) teachers’ current practices of attachment techniques, (2) challenges they encounter in applying attachment principles in the classroom, and (3) what kinds of technological support they believe would be most helpful. The goal is to provide insights that can inform the design of digital training tools and professional development programs that are responsive to real classroom constraints and inclusive of students with diverse needs.

By doing so, this study contributes not only to the literature on teacher-student relationships and inclusive education but also to the growing discourse on how digital tools and structured professional development can help teachers translate theoretical attachment principles into effective everyday practice. Ultimately, stronger emotional attachments fostered via well-supported teachers can lead to more inclusive, supportive, and effective learning environments.

II. MATERIALS AND METHOD

A. Research Design

This study adopted a quantitative survey design to examine teachers’ current practices, awareness, and challenges regarding technology-supported attachment techniques in inclusive education. In addition to documenting existing practices, the research sought to identify teachers’ perceived needs for electronic modules (e-modules) and other technology-enhanced resources that could strengthen their professional development in this area.

B. Participants

Participants comprised 30 primary and secondary school teachers recruited from various schools in West Sumatra, Indonesia. A convenience sampling approach was used to ensure diversity in teaching experience, grade levels, and subject areas. This sampling strategy allowed for an exploratory assessment of teachers’ perceptions and practices without limiting the sample to a specific demographic profile.

All participants taught students with diverse learning needs, including students with disabilities, in inclusive school contexts. Detailed demographic information was not fully documented and is therefore not reported, which is acknowledged as a limitation.

C. Instruments

The survey instrument was developed based on established literature on attachment techniques, inclusive education, and technology-enhanced teacher professional development. It consisted of four major sections:

1) *Current Practices*: Items assessing the use of attachment techniques in the classroom and any technology-mediated strategies employed to support socioemotional learning.

2) *Awareness and Understanding*: Questions measuring teachers' knowledge of attachment theory and their familiarity with technology-supported approaches.

3) *Need for E-Modules*: Items assessing teachers' perceived demand for digital professional development resources focused on attachment techniques.

4) *Challenges Faced*: Items assessing perceived barriers to implementing technology-supported attachment techniques, including training, time constraints, and technological limitations.

To strengthen content validity, three experts in special education and educational technology reviewed the instrument, and its clarity was pilot-tested with a small group of teachers before the main survey. Minor adjustments to wording and structure were made based on feedback. Given the exploratory nature of the study and the instrument's heterogeneous structure, the primary focus was content validity through expert review and pilot testing. Therefore, formal reliability testing was not prioritized at this stage. The findings are intended to provide preliminary insights for future validation studies.

D. Data Collection

Data were collected via an online survey platform (Google Forms) to ensure accessibility and convenience. The survey link was distributed through email and the teacher's social media networks. Participation was voluntary, and respondents were assured anonymity and confidentiality to encourage honest responses. The data collection period lasted for two weeks. Ethical considerations were observed, including informed consent and data security measures consistent with institutional research guidelines.

E. Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequencies and percentages, to summarize teachers' awareness, implementation practices, and perceived needs related to technology-supported attachment techniques. The results were presented as tables and charts to facilitate interpretation and highlight dominant trends in the data. This descriptive approach enabled the study to capture overall response patterns and provide an initial understanding of teachers' perspectives without making inferential claims beyond the available data.

III. RESULTS AND DISCUSSION

A. Results

Data collected from 30 school teachers in West Sumatra revealed several key insights into their understanding and application of technology-supported attachment techniques in education.

1) *Teachers' Understanding of Attachment Techniques*: As shown in Figure 1, respondents' understanding of attachment techniques varied considerably. Although the majority (58.6%) reported being somewhat familiar, only 20.7% indicated being very familiar, while an equal proportion reported having no familiarity. This pattern suggests that teachers' knowledge of attachment concepts remains superficial for many participants.

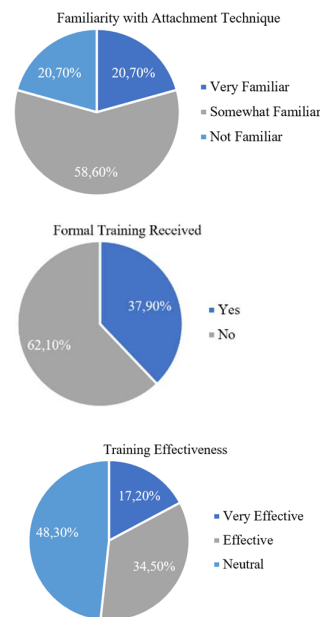


Fig. 1 Respondents' understanding of attachment techniques

Regarding professional training, most respondents (62.1%) had never participated in formal programs related to attachment techniques. Among those who had received training, nearly half (48.3%) rated its effectiveness as neutral. This indicates that existing training programs may lack depth, relevance, or practical applicability, limiting their impact on classroom practices.

2) *Perceived Importance and Implementation*: Figure 2 shows that teachers demonstrated strong awareness of the importance of attachment techniques, with 96.6% rating them as important or very important. In addition, most respondents agreed that students with diverse disabilities require different attachment strategies. Despite this high level of awareness, implementation remained inconsistent. Although 72.4% reported using attachment techniques, more than one-quarter did not apply them in practice. This gap between perceived importance and actual implementation suggests practical and institutional barriers that hinder systematic application.

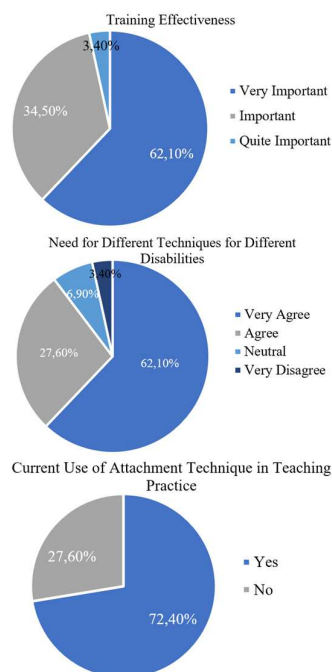


Fig. 2 Respondents' perceptions of the importance of attachment techniques

3) *Frequency of Use, Effectiveness, and Key Challenges:* As illustrated in Figure 3, lack of training emerged as the most significant challenge (55.2%), followed by time constraints (20.7%) and limited resources (17.2%). These findings indicate that structural and capacity-related factors continue to limit teachers' ability to apply attachment-based approaches consistently.

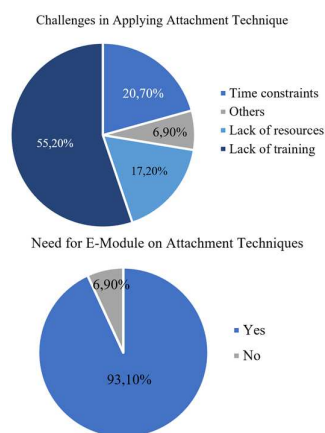


Fig. 3 Respondents' frequency of using attachment techniques

Furthermore, the strong demand for e-modules (93.1%) reflects teachers' recognition of digital learning as a potential solution to overcome training and accessibility limitations. This highlights the perceived role of technology in addressing gaps in professional development.

4) *Preferred Collaborative Learning Formats and Success Factors:* Figure 4 presents respondents' preferences regarding professional learning formats and institutional support. The results indicate that teachers favored theoretical background and practical strategies, suggesting a need for

balanced learning materials that integrate conceptual understanding with classroom application.

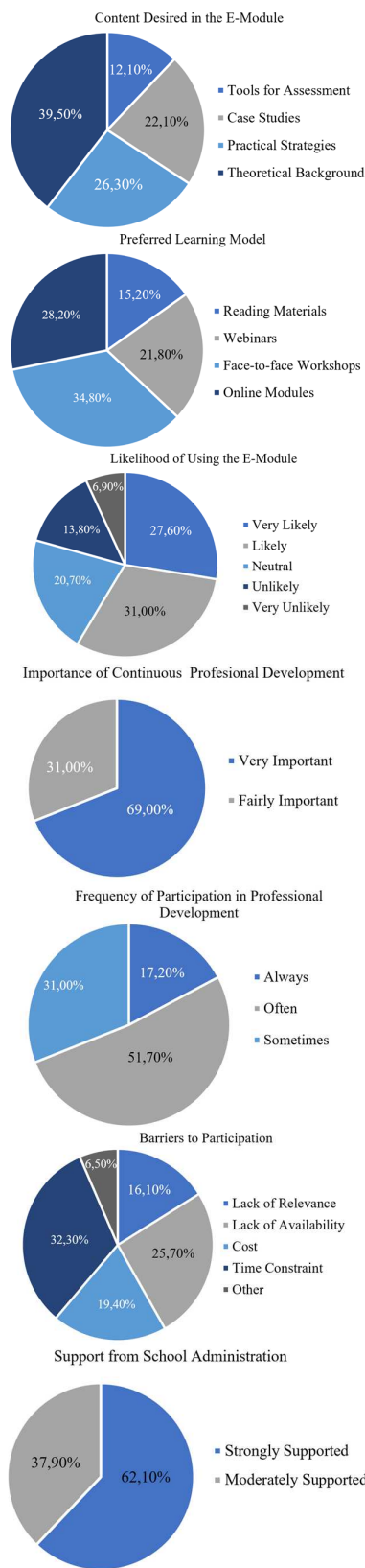


Fig. 4 Respondents' preferences for collaborative professional learning formats

While face-to-face workshops remained the most preferred format, online modules and webinars were also widely selected, indicating openness to blended learning models. In terms of participation, most teachers reported frequent involvement in professional development activities, although time constraints and limited availability remained major barriers. In addition, more than half of the respondents reported strong administrative support, emphasizing the role of leadership in facilitating continuous professional learning.

5) *Desired Content for E-Modules and Professional Development Needs*: Figure 5 illustrates teachers' preferences for collaborative learning and support mechanisms. Observation and feedback, as well as group discussions, were the most preferred learning formats, reflecting the importance of reflective and practice-based learning environments. Understanding individual student needs, patience, and consistency were identified as key factors for successful attachment practices. These findings highlight teachers' awareness of the relational and emotional dimensions of inclusive education.

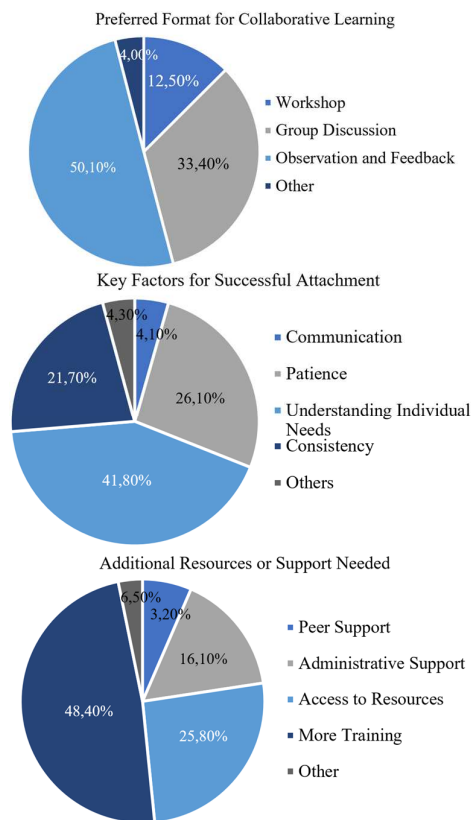


Fig. 5 Desired Content for E-Modules and Professional Development Needs

Moreover, nearly half of the respondents indicated a need for additional training, followed by improved access to resources and stronger administrative support. This reinforces the central role of institutional and professional support systems in sustaining attachment-based practices.

B. Discussion

The findings underscore the critical role of attachment techniques in inclusive education while revealing substantial

gaps in teachers' knowledge and professional preparation. Although most respondents rated attachment techniques as important or very important (Figure 2), more than half reported only moderate familiarity (Figure 1), and 62.1% had never received formal training. This pattern indicates a persistent knowledge gap between perceived importance and professional competence. Such gaps echo longstanding concerns in the literature regarding insufficient preparation in socioemotional and psychological domains essential for inclusive teaching practices [22], [23].

The strong endorsement of attachment techniques aligns with previous studies emphasizing their role in enhancing student engagement and emotional well-being in inclusive settings [16], [24], [25], [26]. Teachers' agreement that different attachment strategies are required for different disabilities (Figure 2) further reflects an emerging awareness of individualized, learner-centered approaches. This orientation resonates with the Universal Design for Learning framework, which advocates flexible instructional strategies responsive to diverse learner needs.

Beyond awareness, however, the findings reveal structural barriers that constrain effective implementation. Lack of training emerged as the most prominent challenge (55.2%), followed by time constraints and limited resources (Figure 3). These barriers help explain why nearly half of trained teachers rated professional development programs as only neutral in effectiveness (Figure 1). Similar patterns have been reported internationally, highlighting the need for sustained and context-sensitive professional learning rather than short-term or fragmented interventions [27], [28], [29].

Despite these challenges, most respondents reported using attachment techniques in practice (Figure 2), and more than half participated frequently in professional development activities (Figure 4). However, uneven perceptions of effectiveness suggest that application alone is insufficient without adequate theoretical grounding, mentoring, and reflective support. Attachment-based approaches are deeply relational and context-dependent, requiring continuity, emotional attunement, and opportunities for professional reflection. Rigid schedules and performance-oriented accountability systems may further limit teachers' capacity to sustain such practices over time.

A particularly significant finding is the overwhelming demand for technology-based professional learning, with 93.1% of respondents expressing the need for an e-module (Figure 3). This demand reflects broader trends in educational technology research, which emphasize the potential of flexible, self-paced learning environments to address time and resource constraints [21]. Respondents' preferences for theoretical foundations and practical strategies (Figure 4), combined with high interest in observation and feedback-based learning (Figure 5), suggest that effective digital training should integrate conceptual understanding with applied, practice-oriented components.

However, the findings also indicate that digital learning alone is unlikely to meet teachers' relational and emotional learning needs. Preferences for face-to-face workshops, group discussions, and collaborative learning formats (Figures 4 and 5) demonstrate the continued importance of social interaction and peer support in professional development. These results align with social constructivist perspectives, which view

professional learning as a socially mediated and reflective process [30]. Blended models that combine asynchronous e-modules with collaborative mentoring and peer dialogue may therefore offer the most promising pathway for strengthening attachment-informed practices.

Institutional support also emerged as a critical enabling factor. Most respondents reported strong or moderate support from school administration (Figure 4), suggesting a relatively favorable organizational climate. Leadership commitment is essential for allocating resources, legitimizing socioemotional learning, and sustaining innovation. Supportive leadership can facilitate the integration of learning management systems and digital training platforms, while also modeling relational values that reinforce attachment-oriented pedagogy [31].

At the individual level, respondents identified understanding individual student needs, patience, and consistency as key factors for successful attachment (Figure 5). These findings emphasize that attachment-informed teaching is not merely a technical skill but a relational disposition developed through experience, reflection, and institutional support. Teachers' requests for additional training and access to resources further underscore the need for systemic investment in professional learning infrastructures.

Taken together, the findings indicate that while teachers in inclusive schools in West Sumatra strongly value attachment techniques, their capacity to implement these approaches is constrained by limited training, uneven-quality professional development, and structural barriers. Technology-enhanced learning, particularly well-designed e-modules integrated with collaborative learning communities, offers a viable pathway to address these gaps. However, such initiatives must be embedded within supportive leadership frameworks and sustained professional learning cultures.

Ultimately, attachment-informed education represents more than a pedagogical strategy; it reflects a philosophy of care that shapes how inclusion is enacted in everyday classroom practice. When teachers are emotionally supported, professionally equipped, and institutionally empowered, they are better positioned to create learning environments in which all students feel secure, valued, and engaged.

Although this study provides valuable preliminary insights into teachers' practices and perceptions of technology-supported attachment techniques, it has several limitations to consider when interpreting the findings. First, the relatively small sample size ($n = 30$) and convenience sampling limit the representativeness of the participants. As a result, the findings may not fully reflect the perspectives of teachers in different regions, school contexts, or educational levels. Therefore, the results should be interpreted with caution and viewed as indicative rather than generalizable to broader populations. Second, the study relied on self-reported data collected by the teachers themselves through an online survey. Such data are subject to potential response bias, including social desirability bias and subjective interpretation of survey items. Teachers may have overestimated or underestimated their actual practices and competencies, which could affect the accuracy of the reported findings. Third, although expert review strengthened content validity, the study did not conduct formal reliability testing. Consequently, the consistency of the measurement instrument across different contexts could not

be statistically verified. Future studies are encouraged to conduct comprehensive reliability analyses to enhance measurement rigor. Fourth, the analysis was primarily descriptive, which limits the depth of interpretation of causal relationships or predictive patterns. While this approach is appropriate for exploratory research, it does not allow for inferences about the underlying factors influencing teachers' practices and perceptions.

Finally, this study was conducted within a specific regional context in West Sumatra, Indonesia. Cultural, institutional, and policy-related factors unique to this setting may influence the findings. Therefore, caution is required when applying the results to other educational contexts. Despite these limitations, the study provides a useful baseline for understanding teachers' needs and challenges related to attachment-based practices and technology-supported professional development in inclusive education. The findings can serve as a foundation for future large-scale and mixed-methods research.

IV. CONCLUSION

This study explored teachers' understanding, practices, and professional development needs related to attachment techniques in inclusive education, with a focus on technology-supported learning. The findings show that although teachers recognize the importance of attachment-based approaches, insufficient training and structural constraints limit their implementation. The strong demand for e-modules and blended learning indicates the need for flexible professional development that integrates theory, practice, and collaborative learning. Institutional support and leadership were also essential to sustaining effective implementation. Despite limitations related to sample size and self-reported data, this study provides preliminary evidence on the potential of technology-enhanced professional development in inclusive settings. Future research should involve larger samples and longitudinal designs to examine long-term impacts. Overall, strengthening attachment-based pedagogy requires integrated efforts that combine digital learning, collaborative support, and responsive leadership to foster inclusive, emotionally supportive learning environments.

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