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Innovations in Microteaching: Web-Based Approaches to Pedagogical Skill Development

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ABSTRACT

The shift to digital learning environments, accelerated by the COVID-19 pandemic, has prompted innovations in teacher education, including the use of web-based microteaching. While traditional microteaching enhances instructional skills, it often lacks flexibility and digital engagement. This study investigates how web-based microteaching supports pedagogical skill development in pre-service English teachers. This qualitative case study involved 25 undergraduate students enrolled in a Microteaching course at the University of Pasir Pengaraian. Data were collected through recorded teaching videos, reflective journals, structured observation checklists, and semi-structured interviews. Participants completed three teaching cycles—two synchronous and one asynchronous—over a 16-week semester. Data were analyzed thematically using Braun and Clarke's (2006) method and organized using NVivo 12 software. Findings showed significant improvement in lesson planning, instructional clarity, classroom management, and reflective depth. Teaching videos demonstrated enhanced lesson structure, use of questioning strategies, and purposeful digital tool integration. Reflective journals evolved from general self-evaluations to more analytical reflections. Peer and instructor feedback, facilitated through digital platforms, played a critical role in supporting iterative development. Web-based microteaching proved effective in fostering both pedagogical competence and digital fluency. Participants reported increased teaching confidence and began to view themselves as emerging professionals. Despite initial technical challenges, repeated practice supported the development of adaptive teaching strategies. These results suggest that structured online microteaching can be a sustainable model for contemporary teacher education.

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1. INTRODUCTION

Microteaching has long been recognized as a core component of teacher education, providing pre-service teachers with structured opportunities to practice instructional skills, receive feedback, and engage in reflective improvement(Sudrajat et al., 2024) . Traditionally conducted in face-to-face settings, microteaching emphasizes lesson planning, instructional delivery, classroom interaction, and post-teaching reflection(Sezaki et al., 2023). However, the rapid digital transformation of education particularly accelerated by the COVID-19 pandemic has significantly altered how microteaching is conceptualized and implemented across teacher preparation programs (Alcivar, 2020; Flanagan et al., 2020; Kormos & Indrarathne, 2025; Ngussa, 2014)

Then, this shift toward web-based microteaching represents not merely a change in instructional modality but a pedagogical transformation grounded in reflective teaching theory and digital pedagogy (Bala et al., 2024; Darma et al., 2021; Matthews, 2025; Yasin Çiftçi, 2016). In addition, reflective teaching theory underscores teachers' capacity to critically examine their instructional decisions and adapt practice based on evidence and feedback (Kolajo, 2025; McAllister et al., 2006; Minott, 2025) . Digital pedagogy, meanwhile, emphasizes the intentional use of technology to enhance learning processes rather than replicate traditional practices online. (Escala et al., 2025). Both of them are the framework further conceptualizes effective teaching as the dynamic integration of content, pedagogy, and technology, a perspective increasingly adopted in studies of online teacher training (Mishra & Koehler, 2020; Schmid et al., 2021; Firmanti et al., 2023).

Besides, recent studies suggest that web-based microteaching offers several pedagogical affordances, including flexibility, access to multimedia resources, and opportunities for recorded reflection (Escala et al., 2025; Shi et al., 2025; Zhang et al., 2025). Synchronous platforms such as Zoom and Microsoft Teams enable real-time interaction, peer observation, and immediate feedback, which are essential for developing instructional confidence and communication skills (Bashardoustjoubjarkouli & Adda, 2024; Wang, 2018). In contrast, asynchronous microteaching allows repeated viewing and delayed feedback, which has been shown to reduce performance anxiety and promote deeper self-analysis (Fehlmann et al., 2023; Januariza & Hendriani, 2016; Yaikhong & Usaha, 2012). Taken together, these findings indicate that both synchronous and asynchronous web-based microteaching modalities offer complementary pedagogical affordances that can support different dimensions of pedagogical skill development. However, the extent to which these affordances are systematically leveraged to foster sustained instructional growth across multiple microteaching cycles remains insufficiently examined, highlighting the need for integrative research that examines how varied digital microteaching modalities can be strategically designed and aligned with pedagogical objectives rather than used in isolation

Furthermore, there are consistently reports positive perceptions of digital microteaching and improvements in technological literacy among pre-service teachers (Louis & King, 2022; Sugihartini et al., 2025). These studies suggest that web-based microteaching environments can enhance familiarity with digital platforms, increase confidence in using instructional technologies, and support flexible teaching practice. However, findings also reveal persistent challenges in translating technological use into pedagogically meaningful practice. Several studies indicate that while pre-service teachers become increasingly proficient in operating digital tools, they often struggle to align technology with instructional goals, learner needs, and content representation, resulting in superficial integration rather than pedagogically grounded teaching. This gap underscores the need to reconceptualize digital microteaching not merely as a space for technological skill acquisition, but as a structured pedagogical environment that deliberately scaffolds instructional decision-making and reflective practice to support the development of coherent and transferable teaching skills.

Despite the increased use of digital platforms in microteaching, little is known about how these environments concretely shape pedagogical skill development across multiple microteaching cycles. Much of the existing literature prioritizes feasibility studies, satisfaction surveys, or single-session interventions, offering limited insight into how instructional skills such as lesson structuring,

questioning strategies, classroom management, and reflective depth evolve over time (Alcivar, 2020; Casanova et al., 2024; Ho et al., 2023; Parfitt et al., 2025; UNESCO, 2019). Moreover, many studies rely heavily on self-reported data, with fewer investigations integrating reflective journals, teaching performance analysis, and in-depth interviews to capture nuanced pedagogical growth (Casanova et al., 2024; Danckwardt-Lilliestrom et al., 2025; Owen, 2016). Consequently, there is a pressing need for empirically grounded research that adopts longitudinal and multi-method approaches to examine how web-based microteaching environments support sustained pedagogical development, moving beyond surface-level evaluations toward a deeper understanding of how teaching skills are constructed, refined, and internalized across iterative microteaching cycles.

Given these limitations, there is a clear need for research that moves beyond technological affordances toward a systematic examination of pedagogical outcomes in web-based microteaching contexts. Ultimately, this study contributes to the growing body of literature on digital innovation in teacher education by foregrounding pedagogy rather than platform, with the aim of informing the design of future teacher education programs in contexts where digital learning is no longer a temporary response but a sustained instructional reality (Bond et al., 2020; König et al., 2022; Moorhouse et al., 2023). Thus, it is highly academic to investigate the innovation in microteaching, especially the web-based approach to achieve the pedagogical skill in higher education.

2. METHODS

2.1 Research Design

This research adopted a qualitative case study approach to explore how web-based microteaching supports the development of pedagogical skills among pre-service teachers. The case study method was selected because it allows for a comprehensive, contextual examination of the participants' experiences within an authentic academic setting (Yin, 2018). The study focused on capturing the teaching practices, reflections, and interactions of the participants as they engaged in online microteaching sessions. Through this approach, the research aimed to uncover deeper insights into how technology-enhanced teaching practice influences pedagogical growth.

2.2 Participants

The study involved 25 students of the English Department of Pasir Pengaraian University enrolled in a Microteaching course at the Faculty of Teacher Training and Education, during the 2024–2025 academic year. Participants were selected purposively because they were all actively involved in at least 3 rounds of online microteaching sessions during the semester. The group included 19 female and 6 male students, aged between 20 and 23. All participants had foundational knowledge of using digital tools like Zoom, Google Meet, and Google Classroom. Prior informed consent was obtained from each participant before any data was collected.

2.3 Research Setting

The research was conducted over a 16-week semester in an online Microteaching course. Throughout the course, each participant conducted three teaching demonstrations using platforms such as Zoom and Google Meet. All teaching sessions were recorded and submitted through Google Classroom, where peers and instructors provided feedback both during live sessions and asynchronously via written comments and video reviews. Authors can elaborate on the literature review or theoretical framework in the introduction, but they can also write it separately.

2.4 Data Collection Instruments

To ensure comprehensive data collection and triangulation, the following tools were used:

a. **Video Recordings of Teaching**
Participants submitted three video recordings of their online microteaching performances. These were reviewed to assess lesson planning, instructional delivery, digital tool integration, and classroom management techniques.
b. **Reflective Journals**
Each participant maintained a weekly reflective journal using Google Docs. These entries captured their preparation processes, personal teaching experiences, encountered challenges, and key takeaways.
c. **Semi-Structured Interviews**
Ten participants were randomly selected for follow-up interviews, each lasting approximately 30–45 minutes via Zoom. These interviews aimed to explore their experiences with online teaching, their use of technology, and their reflections on their pedagogical development.
d. **Observation Checklist**
The researcher used an adapted version of the Stanford Microteaching Observation Form to assess the recorded teaching videos. The checklist evaluated aspects such as instructional objectives, questioning strategies, student interaction, and use of media.
e. **Instructor Feedback**
Written feedback provided by course instructors after each microteaching session was collected and analyzed to complement the participants' reflections and the researcher's observations.

2.5 Procedure

The research was carried out in several stages throughout the semester:

a. **Weeks 1–2**: Students were introduced to the concept of digital microteaching and trained on using web-based teaching tools effectively.
b. **Weeks 3–5**: The first teaching session (live via Zoom) was conducted, followed by group feedback and written reflections.
c. **Weeks 6–9**: Students carried out asynchronous microteaching (recorded sessions uploaded to Google Classroom), with feedback provided in writing by peers and lecturers.
d. **Weeks 10–13**: Participants completed a final synchronous teaching session and received live feedback.
e. **Weeks 14–15**: Students submitted their final reflective journals, and selected individuals were interviewed.
f. **Week 16**: The researcher finalized the collection and analysis of videos, journals, and interviews.

Throughout the course, participants were encouraged to apply digital tools creatively, use student-centred teaching strategies, and reflect on their development using the TPACK framework.

2.6 Data Analysis

The collected data were analysed using thematic analysis, following the six steps proposed by Braun and Clarke (2006): (1) familiarization with the data, (2) generating initial codes, (3) identifying themes, (4) reviewing themes, (5) defining and naming themes, and (6) compiling the report. Interview transcripts and reflective journals were manually coded to identify emerging patterns related to teaching improvement, technology integration, and reflective habits. Teaching videos were assessed using a rubric and cross-checked with journal content to measure changes in performance over time. NVivo 12 software was used to organize and manage the coded data.

This study applied a descriptive qualitative research design to explore students' needs in using a digital listening module enriched with local wisdom. The qualitative approach was selected to allow a deeper understanding of students' perceptions, preferences, and learning challenges in a natural learning setting. The research was conducted at the English Study Program of the University of Pasir Pengaraian in February 2025, involving 22 students in their second semester. These participants were chosen purposively because they had been actively engaged in basic listening courses and had experienced conventional materials, such as printed modules and non-interactive PDFs. Their feedback was crucial to provide insights into what kind of digital content would be more effective, engaging, and culturally relevant. The study emphasizes the importance of aligning technology-enhanced learning materials with students' actual expectations and local cultural contexts, which are often overlooked in the design of conventional academic resources.

The main instrument used in this research was a closed-ended questionnaire designed using Google Forms, which was distributed via WhatsApp to each participant for convenience and accessibility. The questionnaire contained 30 items, divided into three main indicators: students' listening needs, digital module features, and the role of local wisdom in learning. The responses were measured using a 5-point Likert scale, ranging from "Totally Disagree" to "Totally Agree." In addition to the questionnaire, the researcher employed documentation techniques to support the contextual understanding of the learning environment, such as reviewing current teaching materials used in listening classes. The data were analysed using percentage analysis to determine the frequency of each response, helping identify dominant patterns and preferences. This method enabled the researcher to capture not only the general tendencies among students but also the gaps between their current learning experience and their ideal expectations for a more interactive, modern, and culturally grounded digital module.

3. FINDINGS AND DISCUSSION

This section presents the key findings from the study and discusses them in relation to current literature and pedagogical theory. Data were analysed thematically and are organised into four primary themes: (a) Enhancement of Pedagogical Skills through Online Microteaching, (b) Technology as a Mediator for Reflection and Feedback, (c) Student Challenges in Web-Based Environments, and (d) Transformational Growth in Teaching Confidence and Professional Identity.

3.1 Enhancement of Pedagogical Skills through Online Microteaching

The analysis of teaching video recordings revealed a gradual improvement in participants' pedagogical performance across successive microteaching cycles. In the initial sessions, many participants demonstrated limited clarity in articulating instructional objectives and sequencing lesson activities. Teaching videos frequently showed extended teacher-centered explanations, minimal scaffolding, and insufficient time allocated for student responses. These patterns indicate that participants initially prioritized content coverage over instructional coherence.

As participants progressed through subsequent microteaching cycles, observable changes in instructional delivery emerged. By the third session, lessons were more systematically structured, with clearer openings, smoother transitions between activities, and more deliberate lesson closure. Questioning techniques also improved, as participants increasingly employed open-ended and probing questions rather than relying solely on display questions. Video analysis further showed better management of instructional time, with participants allocating space for student interaction and feedback.

Reflective journal entries corroborated these observed improvements. Participants increasingly demonstrated awareness of pedagogical planning and execution, noting specific instructional adjustments made between sessions. One participant reflected that planning questions in advance helped maintain lesson focus and student engagement. Such reflections suggest that repeated web-

based microteaching enabled participants to internalize feedback and refine their pedagogical decision-making over time.

3.2 Technology as a Mediator for Reflection and Feedback

Findings indicate that digital technology played a significant role in shaping participants' reflective practices. The availability of recorded teaching sessions allowed participants to review their instructional performance in detail, often identifying aspects of their teaching that were not immediately apparent during live delivery. Teaching videos served as concrete artifacts that supported focused reflection on verbal clarity, pacing, and interactional patterns.

Reflective journals demonstrated a progression in the depth and specificity of participants' reflections. Early journal entries tended to include general self-evaluations, such as expressing nervousness or lack of confidence. Over time, reflections became more analytical, addressing specific pedagogical elements such as the use of wait time, clarity of instructions, and effectiveness of questioning strategies. This shift indicates increased metacognitive engagement with teaching practice.

In addition to self-reflection, digital platforms facilitated structured feedback from peers and instructors. Written comments and asynchronous feedback allowed participants to revisit suggestions during lesson revision, supporting iterative improvement. Participants reported that this form of feedback encouraged more careful consideration of instructional choices, contributing to a sustained reflective cycle across microteaching sessions.

3.3 Student Challenges in Web-Based Environments

Despite evidence of pedagogical growth, participants encountered several challenges related to the web-based teaching environment. Technical issues such as unstable internet connections, delayed audio, and limited device functionality occasionally disrupted lesson flow. Teaching videos captured moments where instruction was interrupted due to connectivity problems, affecting continuity and classroom interaction.

Participants also experienced difficulty maintaining student engagement in virtual settings. The absence of physical classroom cues, such as eye contact and body language, made it challenging to assess student understanding and responsiveness. Reflective journals frequently noted uncertainty about whether students were attentive or comprehending the material, particularly when cameras were turned off or participation was minimal.

Another recurring challenge involved cognitive load associated with managing both instructional content and digital tools simultaneously. Participants reported feeling overwhelmed when operating screen-sharing features, chat functions, and breakout rooms while delivering instruction. Although some improvement was observed across sessions, journal entries suggest that balancing pedagogical and technological demands remained a complex task for several participants.

3.4 Transformational Growth in Teaching Confidence and Professional Identity

By the end of the study, many participants expressed increased confidence in their teaching Analysis of journal entries and interview data revealed notable growth in participants' teaching confidence over the course of the study. In early sessions, participants frequently expressed anxiety about making mistakes and managing the online classroom. Teaching videos reflected this uncertainty through hesitant delivery, rigid adherence to lesson plans, and limited responsiveness to student input.

As participants gained experience through repeated microteaching cycles, their confidence became more evident. Later teaching videos showed stronger instructional presence, clearer teacher talk, and increased willingness to adapt instruction in response to student contributions. Participants appeared more comfortable navigating both pedagogical and technological aspects of teaching.

Participants' reflections further indicate an emerging sense of professional identity. Many began to describe themselves as teachers rather than students completing an assignment, emphasizing responsibility for student learning and instructional effectiveness. This shift suggests that web-based microteaching not only supported skill development but also contributed to participants' evolving self-concept as future educators.

Discussion

The implementation of web-based microteaching for students at the English Department in this study revealed significant improvements in pedagogical performance, reflective practice, and confidence. This finding aligns with Alghamdi & Shah (2021), who reported that digital microteaching fosters adaptability and self-assessment in teacher education during remote learning transitions. Participants in this study developed a deeper understanding of lesson planning, classroom management, and interactive teaching strategies through repeated online teaching sessions and peer feedback.

a. Enhancement of Pedagogical Skills through Online Microteaching

The findings of this study provide strong evidence that web-based microteaching serves as an effective pedagogical intervention for enhancing core teaching competencies among pre-service teachers. Participants demonstrated notable progress in lesson planning, instructional delivery, classroom interaction, and time management across successive microteaching cycles. Initially, many participants struggled to articulate clear instructional objectives and to manage student responses in real time, particularly within the constraints of a virtual environment. However, through repeated practice and systematic feedback, participants exhibited increasingly coherent lesson structures, more purposeful questioning strategies, and smoother instructional transitions.

These findings reinforce previous studies indicating that microteaching, when conducted through a structured and cyclical approach, contributes to gradual and sustained pedagogical development (Bashardoustjoubjarkouli & Adda, 2024; Brown, 2018). In contrast to conventional one-time microteaching sessions, the web-based format in this study fostered continuous engagement with instructional tasks, enabling participants to repeatedly review, evaluate, and refine their teaching practices. Such an iterative model reflects constructivist views of teacher learning, which conceptualize professional growth as a progressive process of constructing meaning through experience, reflection, and feedback. Additionally, the flexibility afforded by online platforms allowed participants to concentrate more intentionally on discrete instructional competencies—such as effective questioning strategies and lesson closure techniques—without the immediate situational pressures typically encountered in face-to-face classroom settings.

Significantly, the observed improvement in pedagogical competence was not limited to the enhancement of technical teaching skills but also encompassed the development of pedagogical reasoning. Participants demonstrated increasing sensitivity to students' needs, more thoughtful management of instructional pacing, and stronger alignment among learning objectives, classroom activities, and assessment strategies. These outcomes substantiate Karlström and Hamza's (2019) argument that digitally mediated microteaching, when accompanied by structured and constructive feedback, promotes deeper pedagogical understanding rather than merely fostering surface-level instructional performance.

b. Technology as a Mediator for Reflection and Feedback

A central contribution of this study lies in its identification of technology as a powerful mediator of reflective practice and pedagogical feedback. Rather than functioning solely as a delivery mechanism, digital tools—particularly video recordings, learning management systems, and asynchronous discussion forums—created a reflective ecology that supported sustained professional

growth. Participants consistently reported that the ability to rewatch their teaching performances enabled them to notice aspects of their instructional behavior that were previously overlooked, such as excessive teacher talk, unclear instructions, or limited student engagement.

This finding aligns closely with research emphasizing the role of video-based reflection in fostering metacognitive awareness among pre-service teachers (Anum et al., 2025; Benson, 2015; Hendrickson & Goh, 2024; Kamelia, 2019; Nurazima Juhastri et al., 2024; Rahayu et al., 2024). The permanence of recorded teaching episodes allowed participants to engage in slow, deliberate analysis of their practice, moving beyond impressionistic self-evaluation toward evidence-based reflection. Reflective journals further revealed that participants began to articulate more specific and actionable goals for improvement, indicating a shift from descriptive to analytical reflection.

Furthermore, the asynchronous nature of online feedback environments enhanced the quality of peer and instructor responses. Unlike traditional oral feedback, which is often constrained by time and immediacy, written feedback on digital platforms encouraged more thoughtful, detailed, and critical engagement with teaching performances. This supports the findings of Handoko & Ayumi (2022)that asynchronous feedback environments promote deeper pedagogical dialogue and collaborative learning. Collectively, these processes strengthened the reflective cycle and positioned reflection as an integral component of pedagogical development rather than a supplementary activity.

c. Student Challenges in Web-Based Environments

Despite its pedagogical affordances, web-based microteaching also presented a range of challenges that influenced participants' learning experiences. Technical issues, including unstable internet connections, audio delays, and device limitations, intermittently disrupted teaching sessions and increased cognitive load. These challenges are consistent with prior studies highlighting infrastructural constraints as a persistent barrier in online teacher education (Kartal, 2020; Reichert et al., 2020; Sezaki et al., 2023; Torres Cuevas & Quilaqueo Rapimán, 2024)

Beyond technical concerns, participants reported difficulty maintaining student engagement and managing classroom dynamics in virtual settings. The absence of physical presence limited the use of non-verbal cues, proximity, and spontaneous interaction—elements traditionally central to classroom management. This finding reinforces (Beni et al., 2022)observation that online teaching environments often reduce immediacy and complicate interactional control. Additionally, participants experienced heightened cognitive demands as they simultaneously managed instructional content, technological tools, and student interaction, particularly during early microteaching sessions.

However, a notable outcome of this study is the extent to which participants adapted to these challenges over time. Through repeated exposure and guided practice, students developed greater technological fluency and self-regulatory strategies, enabling them to manage digital tools more effectively while teaching. This adaptive process mirrors findings by Cobongela, (2025) and Louis & King (2022), who argue that online teaching experiences can foster resilience and autonomous learning skills among pre-service teachers. These results suggest that while challenges are inherent in web-based microteaching, they also serve as productive tensions that stimulate professional growth when appropriately scaffolded.

d. Transformational Growth in Teaching Confidence and Professional Identity

Beyond observable skill development, the findings indicate that web-based microteaching facilitated transformative growth in participants' teaching confidence and professional identity. By the final microteaching cycles, participants expressed a stronger sense of self-efficacy and professional legitimacy, often describing themselves as "real teachers" capable of navigating diverse instructional contexts. This affective and identity-related growth is particularly significant, given that microteaching has traditionally been conceptualized as a technical training tool rather than a space for identity formation.

The digital format appeared to reduce performance anxiety, especially in asynchronous or recorded teaching contexts, allowing participants to experiment with instructional strategies without fear of immediate judgment. This supports Bárkányi & Brash (2025)claim that online environments can lower affective barriers and promote pedagogical risk-taking. Moreover, participants' increasing ability to make informed decisions about technology use, content representation, and learner engagement reflects the development of integrated technological pedagogical content knowledge as theorized by (Escala et al., 2025).

Then, the structured integration of experiential learning cycle further strengthened this transformational process (Nuriyanti et al., 2019). By systematically engaging in planning, action, reflection, and re-planning, participants developed adaptive expertise and professional agency. These findings challenge assumptions that digital microteaching lacks authenticity (Sugihartini et al., 2025)and instead align with more recent scholarship asserting that professional identity and authentic teaching competence can be cultivated in well-designed digital environments (Aditya, 2019; Safa et al., 2015; Shi et al., 2025).

4. CONCLUSION

In conclusion, this study confirms that web-based microteaching constitutes an effective and sustainable pedagogical model for strengthening pre-service teachers' instructional competencies, as evidenced by measurable improvements in lesson planning, instructional delivery, classroom management, reflective capacity, and professional confidence through structured cycles of synchronous and asynchronous practice supported by systematic feedback. The findings underscore that repeated online teaching experiences, combined with guided reflection and peer–instructor input, foster adaptive pedagogical skills responsive to contemporary and post-pandemic educational demands, while also contributing to the development of professional identity. These results carry important implications for curriculum designers, teacher educators, and policymakers to institutionalize structured digital microteaching within teacher education programs, supported by coherent assessment frameworks and adequate technological infrastructure. Nevertheless, this study is limited by its specific institutional context and participant group, as well as initial disparities in technological access and digital fluency, which may affect the generalizability of the findings. Future research should therefore undertake longitudinal studies following pre-service teachers into their in-service careers, conduct comparative analyses of online, hybrid, and face-to-face microteaching models, and explore contextual and cultural factors shaping the implementation of digital pedagogies in order to further validate and refine web-based microteaching as an equitable and robust framework for teacher education.

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