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Analyzing WhatsApp-Based Learning Interactions: Teaching Skills and Student Responses in Indonesian Higher Education

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Abstract: This study explores how lecturers' teaching skills and student responses manifest in WhatsApp-based learning environments in Indonesian higher education. Focusing on three classes of an "Introduction to Education" course, the research employs a qualitative descriptive approach and content analysis of chat transcripts and voice notes over 16 weeks. To frame the analysis, Asril's model of basic teaching skills—covering questioning, explanation, reinforcement, and classroom management—was applied, alongside Hanifi and Rahayu's taxonomy of student responses, which distinguishes between obedient, independent, pretentious, dependent, and stolid learner behaviors. Trustworthiness was ensured through inter-coder reliability checks and triangulation of text and voice-note data, enhancing the validity of findings. The study also draws on constructivist, connectivist, and rhizomatic pedagogy perspectives, with "rhizomatic" referring to decentralized, non-linear pathways of knowledge building. The results indicate that lecturers primarily used Opening and Closing, Further Questioning, and Reinforcement skills, while students most frequently responded as Independent learners, followed by Obedient and Pretentious types. These findings suggest that WhatsApp can support meaningful teaching–learning interaction, though its design limits collaborative and differentiated instruction. The study highlights the adaptability of core teaching competencies to digital platforms and emphasizes the need for strategic scaffolding to foster learner autonomy. Limitations include the scope of data and a lack of multimodal behavioral insight. The findings have implications for mobile pedagogy, digital curriculum planning, and future research in digitally mediated instruction.

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Introduction

The growing integration of mobile technologies into higher education has significantly transformed teaching and learning practices, particularly in developing contexts. Among various mobile applications, WhatsApp has emerged as a widely adopted tool in academic settings, owing to its ease of use, real-time communication capabilities, and low data requirements. While initially developed for social interaction, WhatsApp is increasingly repurposed for educational engagement, enabling communication, peer collaboration, and content dissemination beyond the confines of traditional classrooms (Bottentuit Junior et al., 2016; Stone & Logan, 2018). Such integration reflects a shift toward "rhizomatic and learner-centered pedagogies" in digital spaces, with "rhizomatic pedagogy" referring to non-linear, decentralized, and interconnected pathways of learning that resemble the growth of plant rhizomes, allowing knowledge to spread flexibly across networks (Cormier, 2008; Makoza & Bagui, 2022).

The relevance of WhatsApp intensified during the COVID-19 pandemic, which forced educational institutions to transition to remote learning modalities rapidly. WhatsApp became a lifeline for academic continuity in countries with limited digital infrastructure due to its ubiquitous availability and user familiarity (Zhakata, 2022; Ujakpa et al., 2018). WhatsApp facilitated basic instruction and supported community building and emotional connection among students, enhancing their sense of belonging in the virtual learning environment (Stone & Logan, 2018; Malik et al., 2019). Studies across diverse settings confirm that WhatsApp enhances academic performance, student engagement, and team effectiveness when used intentionally in instructional design (Lee et al., 2023; Ahmad et al., 2023). Moreover, systematic reviews indicate that WhatsApp fosters multiple forms of engagement—cognitive, emotional, and behavioral—particularly in language learning and collaborative task environments (Syairofi et al., 2023; Cetinkaya, 2017).

WhatsApp has become indispensable in Indonesian higher education, especially among institutions with constrained access to formal Learning Management Systems (Rahmadi, 2020). It is an economical teaching alternative, enabling both synchronous and asynchronous interaction. WhatsApp group chats are frequently used to share learning resources, clarify instructions, organize discussions, and provide affective support. However, some studies have noted that usage tends to be surface-level unless educators deliberately scaffold higher-order thinking tasks or reflective interactions (Yunus et al., 2019; Amry, 2014). Despite its widespread use, research into the pedagogical dynamics and instructional frameworks that unfold within WhatsApp-based interactions remains underdeveloped. Most studies focus on perceptions, usability, or macro-level learning outcomes (Mtega, 2021; Nuuyoma et al., 2020), while neglecting the micro-level interactional practices and cognitive demands embedded in chat-based learning.

This study addresses that gap by analyzing actual WhatsApp chat transcripts and voice notes from an "Introduction to Education" course at a higher education college in regional Indonesia. The analysis is grounded in Asril's (2011) framework of basic teaching skills—such as questioning, explanation, reinforcement, and class management—providing a lens to examine how lecturers transfer these traditional competencies into a digital space. At the same time, Hanifi and Rahayu's (2014) theory of student responses is applied, classifying learners' behaviors into obedient, independent, pretentious, dependent, and stolid categories. Together, these frameworks enable systematic exploration of instructional practices and learner engagement within WhatsApp-mediated pedagogy.

This investigation is also informed by constructivist and connectivist theories, emphasizing the importance of social interaction, knowledge co-construction, and learner autonomy in digitally mediated education (Siemens, 2005; Vygotsky, 1978). The study is further guided by empirical findings suggesting that WhatsApp enhances various aspects of engagement when aligned with instructional goals (Murire & Gavaza, 2023; Syairofi et al., 2023). Nevertheless, challenges such as unstructured information flow, non-academic distractions, and inconsistent participation can reduce its pedagogical effectiveness, particularly when instructors lack clear strategies or feedback mechanisms (Binsuhaim, 2025; Makoza & Bagui, 2022). Ethical concerns such as digital boundaries, data privacy, and platform fatigue are also increasingly relevant and must be acknowledged (Koltay, 2016; Manca & Ranieri, 2016).

This study offers a granular view of WhatsApp-mediated teaching practices and student responses, providing empirical insights into the affordances and constraints of mobile pedagogy. It contributes by mapping micro-level pedagogical interactions on WhatsApp,

highlighting how established teaching skills and response frameworks can be adapted to mobile learning environments. This contribution is significant for educators and policymakers seeking to design digitally mediated instruction in resource-constrained contexts, as it demonstrates both WhatsApp's potential and limitations for fostering meaningful engagement and learner autonomy.

Research Method

This study employed a qualitative descriptive design to investigate instructional interactions between lecturers and students within WhatsApp group chats for a college "Introduction to Education" course. The central aim was to explore the types of basic teaching skills demonstrated by lecturers and the corresponding categories of student responses in this digital learning context. A qualitative descriptive approach was deemed suitable for capturing the nuances of instructional communication in everyday terms, enabling rich and accessible insights into naturally occurring phenomena (Sandelowski, 2000).

The methodological orientation drew from digital ethnography (Addai-Mununkum, 2023) and qualitative content analysis traditions (Forman & Damschroder, 2007; Puppis, 2019). This approach facilitated the analysis of real-time, unfiltered online classroom interactions without researcher interference, allowing authentic observations of educational dynamics in digital spaces. WhatsApp was selected as the primary medium for data collection due to its widespread adoption in educational settings, particularly during and after the COVID-19 pandemic (Doğan, 2023). Its multimodal communication features—text, voice notes, emojis, and file sharing—offered unique opportunities to analyze digital pedagogical practices and student engagement behavior.

The data comprised archived WhatsApp group chats and voice note transcripts from three student cohorts—Classes A, B, and C—enrolled in the first-semester “Introduction to Education” course of a recent academic year in the researchers’ college. Two conversations per class group were purposively selected to ensure manageability and depth of qualitative analysis while still capturing a representative interaction sample across the 16-week course. The chosen conversations corresponded to sessions in which core pedagogical content was introduced and discussed, thus reflecting both lecturer-driven instruction and student engagement dynamics. This sampling strategy balanced breadth (covering multiple class groups) and depth (examining extended discussions in detail), making it suitable for the study’s exploratory aims. Both written messages and voice notes were included to capture the full range of communicative interactions. The data were retrieved from the institutional Moodle platform, where instructors had uploaded session documentation. All identifiable information was anonymized to protect participant confidentiality, and ethical clearance was obtained from the college’s research ethics committee. Additionally, consent to use archival data was secured from both course instructors and administrative personnel.

The analytical framework followed the interactive model proposed by Miles and Huberman (1994), which encompasses three iterative stages: data reduction, data display, and conclusion drawing/verification. This model was chosen for its adaptability and effectiveness in managing large volumes of qualitative data, particularly in educational research contexts (Mutiani et al., 2022). The process began with data reduction, wherein chat logs and voice notes were filtered to exclude non-instructional content such as greetings, casual humor, or off-topic exchanges. The remaining dataset was then analyzed using a deductive coding scheme derived from established frameworks on teaching competencies and student behavior.

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To adapt these frameworks for the WhatsApp environment, Asril's (2011) teaching skills—originally developed for face-to-face classroom contexts—were operationalized to fit digital interactions, such as interpreting "questioning" through text prompts and "reinforcement" through emoji use, short affirmations, or follow-up queries. Similarly, Hanifi and Rahayu's (2014) categories of student responses were applied to chat and voice-note interactions, with attention to both linguistic content and digital cues (e.g., message timing, brevity, and use of symbols) that signal obedience, independence, or pretentious participation.

Subsequently, the coded data were organized using visual analytic techniques, including frequency tables and narrative matrices, to illustrate the prevalence and distribution of instructional strategies and student responses across class groups and communication modes (e.g., text versus voice). These tools enabled structured comparisons and pattern identification. The final analytical stage involved concluding the coded and visualized data. This included identifying recurring instructional patterns, assessing the consistency of student responses, and interpreting the pedagogical implications within the broader teaching and learning theory framework.

To ensure the trustworthiness of findings, inter-coder reliability checks were conducted. A second researcher independently coded 20% of the dataset, yielding an inter-coder agreement rate of 85%. Any discrepancies were discussed and resolved collaboratively to refine the coding schema and enhance analytic rigor (Elo & Kyngäs, 2008).

The methodological decision to use WhatsApp chat transcripts aligns with existing research validating their value in capturing authentic pedagogical discourse in real-world learning environments (Ajani et al., 2023; Bottentuit Junior et al., 2016). Although prior studies have utilized content analysis software such as NVivo or Targuette to increase transparency and analytic rigor, this study opted for manual coding due to the manageable data volume and focused analytic scope (Addai-Mununkum, 2023). Overall, integrating structured qualitative analysis with naturally occurring digital artifacts allowed for a rigorous and context-sensitive exploration of mobile-mediated instruction.

Results and Discussion

This section presents the results of the analysis of WhatsApp group chats and voice note transcripts from three classes (A, B, and C) in the "Introduction to Education" course. The findings are organized into two primary categories: (1) teaching skills demonstrated by lecturers and (2) student response types. Results are presented in summary tables to illustrate frequency and distribution across text (chat) and audio (voice note) modalities.

The first result is about basic teaching skills used by lecturers. As shown in Table 1, 129 instances of basic teaching skills were identified across the three classes. These were categorized into nine skill types. The most frequently employed skills were *Opening and Closing Lessons (OC)* (31 instances), *Further Questioning (FQ)* (29), and *Reinforcement (RS)* (23). The least observed were *Skill for Variation (SV)* (1), and no instances were recorded for *Small Group Discussion (SLD)* and *Small Group Individual (STI)* skills.

Table 1. Teaching Skills Applied by Lecturers in WhatsApp Chats and Voice Notes

Teaching Skill Type	Class A (Chat)	Class A (VN)	Class B (Chat)	Class B (VN)	Class C (Chat)	Class C (VN)	Total
Basic Questioning (BQ)	3	1	6	0	0	0	10
Further Questioning	12	0	8	0	9	0	29

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(FQ)							
Reinforcement (RS)	8	1	4	2	5	3	23
Skill for Variation (SV)	1	0	0	0	0	0	1
Explanation (ES)	7	5	6	0	3	0	21
Opening and Closing Lessons (OC)	8	1	8	2	11	2	32
Classroom Management (CM)	5	1	3	0	5	0	14
Small Group Discussion (SLD)	0	0	0	0	0	0	0
Small Group Teaching Individual (STI)	0	0	0	0	0	0	0
Total	44	9	35	4	33	5	129

The second result of this research is about student responses to teaching and learning. As Table 2 shows, student behavior analysis revealed 310 responses across all three classes. Student responses were categorized into five types: *Obedient Student (OS)*, *Independent Student (IS)*, *Pretentious Student (PS)*, *Dependent Student (DS)*, and *Stolid Student (SS)*. Among these, *Independent Student (IS)* responses were most frequent (161 instances), followed by *Obedient Student (OS)* (111). No responses were coded under *Dependent* or *Stolid Student* types.

Table 2. Student Responses by Category and Modality

Response Type	**Class A (Chat)**	**Class A (VN)**	**Class B (Chat)**	**Class B (VN)**	**Class C (Chat)**	**Class C (VN)**	**Total**
Dependent Student (DS)	0	0	0	0	0	0	0
Obedient Student (OS)	32	0	31	0	48	0	111
Independent Student (IS)	24	19	56	8	54	0	161
Pretentious Student (PS)	1	0	4	0	24	9	38
Stolid Student (SS)	0	0	0	0	0	0	0
Total	57	19	91	8	126	9	310

To better visualize the distribution, Figure 1 and Figure 2 compare the top three teaching skills and student response types across classes. These results indicate that lecturers predominantly engaged in opening/closing lessons, further questioning, and reinforcement, suggesting a focus on managing participation and prompting engagement. Students responded most frequently as independent learners, showing initiative and inquiry, followed by obedient responses reflecting passive compliance rather than active engagement.

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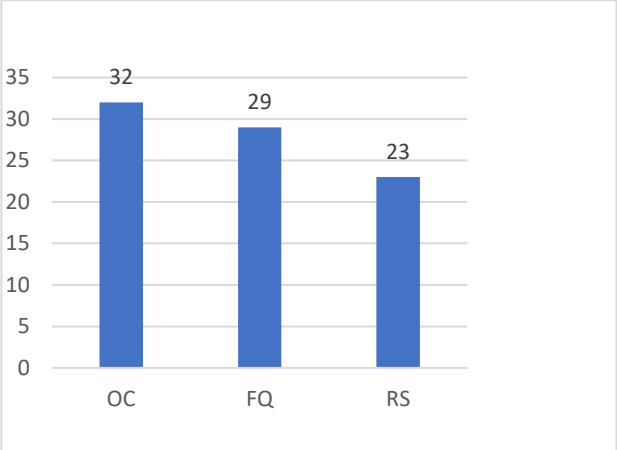

Figure 1. Top Teaching Skills by Frequency

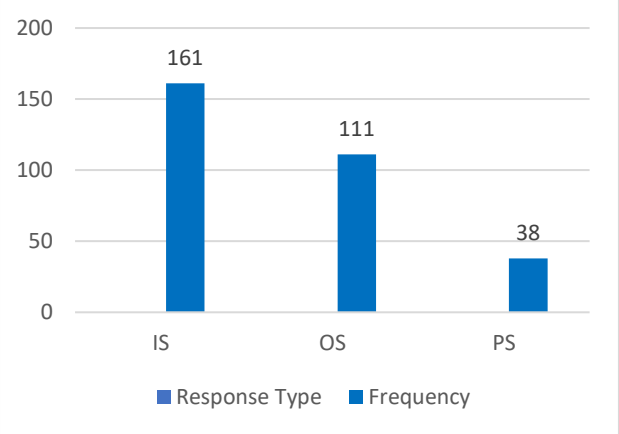

Figure 2. Student Response Types by Frequency

As presented above, this study explored lecturers' instructional practices and students' responses within WhatsApp-mediated learning environments across three “Introduction to Education” classes. The findings reveal a dynamic interplay between digital pedagogical strategies and learner engagement, captured through chat messages and voice notes. These interactional patterns align with broader scholarly perspectives on mobile learning, particularly within resource-constrained educational contexts where digital platforms play a critical instructional role.

The dominant instructional strategies observed—Opening and Closing lessons, Further Questioning, and Reinforcement—demonstrate lecturers’ capacity to adapt core teaching competencies to asynchronous mobile environments. These practices are consistent with foundational frameworks by Asril (2011) and Mansyur (2017), which underscore the importance of clarity, continuity, and motivation in effective instruction. Additionally, the results support the blended learning principles articulated by Garrison and Vaughan (2008), particularly the need for structure, presence, and interaction in digital pedagogy.

The absence of strategies such as Small Group Discussion and Small Group Individual Teaching reflects WhatsApp’s limitations in supporting collaborative or differentiated instruction. Prior studies have noted that WhatsApp facilitates linear, whole-group communication rather than layered or branching dialogues (Koltay, 2016; Manca & Ranieri, 2016). Rahmadi, 2020; Syairofi et al., 2023). This suggests that lecturers must move

beyond transactional exchanges by intentionally designing scaffolding strategies—for example, rotating leadership in discussion threads, assigning peer feedback tasks, or structuring debates through sequenced prompts—to encourage deeper collaboration and critical thinking.

Moreover, the limited deployment of voice notes—despite their potential to support multimodal engagement—suggests several contextual constraints, such as connectivity issues, digital fatigue, or technical limitations, which are common in low-bandwidth environments (Zahro, 2022; Zhakata, 2022). Nevertheless, some lecturers' use of voice-based explanation and reinforcement illustrates an emerging multimodal pedagogy that harnesses WhatsApp's affordances in creative and responsive ways (Doğan, 2023; Murire & Gavaza, 2023). These underuse and new emergence highlight the need for training lecturers to integrate multimodal tools strategically, such as alternating between text and voice for explanation, or encouraging students to summarize key points through short audio reflections. Such practices can enrich WhatsApp-based learning and reduce overreliance on text-heavy interaction.

On the student side, participation was predominantly marked by Independent and Obedient response types, reflecting learner initiative and compliance. These engagement patterns are consistent with constructivist and connectivist theories advanced by Vygotsky (1978) and Siemens (2005), emphasizing autonomy, peer collaboration, and self-regulation in learning processes. The findings also align with empirical evidence suggesting that when used intentionally, WhatsApp promotes student-centered learning and active behavioral engagement (Lee et al., 2023; Ahmad et al., 2023; Hidayati et al., 2022; Nugroho, 2022).

However, a contradiction emerges: students frequently demonstrated independence (e.g., initiating questions, providing extended answers) while showing pretentious behavior (e.g., superficial or performative participation). This duality may stem from pressures of group visibility and digital impression management, where students balance genuine engagement with a need to appear active. This suggests that while WhatsApp fosters autonomy, it also creates opportunities for "fake engagement," emphasizing the importance of instructor feedback and task design that requires authentic cognitive effort rather than surface-level responses.

The absence of Dependent and Stolid responses in the dataset may be attributed to limitations in data visibility or the inherent difficulty in detecting passive disengagement in text-based formats. Previous studies note that passive behaviors, such as "lurking" or silent reading, are prevalent yet often invisible in online learning environments (Rahmadi, 2020; Mtega, 2021), pointing to the need for methodological triangulation through interviews or learning analytics to capture the full spectrum of learner engagement.

These findings reinforce WhatsApp's value as a mobile learning platform, particularly in contexts lacking formal Learning Management Systems (Amry, 2014). When guided by deliberate instructional strategies such as Explanation, Further Questioning, and Reinforcement, WhatsApp can foster metacognitive awareness and communicative skill development (Cetinkaya, 2017; Bottentuit Junior et al., 2016). The alignment between lecturers' pedagogical behaviors and students' autonomous participation further illustrates how instructional intention can yield meaningful learning even in informal, mobile-mediated settings.

Nonetheless, the study underscores that WhatsApp's pedagogical utility is not inherently assured. Prior research cautions that without structured scaffolding and purposeful interaction, mobile learning on WhatsApp may remain superficial (Yunus et al., 2019; Khan,

2020). The current findings support this view, demonstrating that instructor initiative significantly shapes the quality and authenticity of student engagement. This observation is consistent with Binsuhaim's (2025) assertion that instructional clarity, task design, and teacher presence are critical determinants of student participation depth.

Finally, this study highlights WhatsApp's rhizomatic potential—its capacity to support knowledge circulation through flexible, decentralized pathways, as described by Cormier (2008) and expanded by Makoza and Bagui (2022). However, to fully harness this potential, educators must move beyond transactional messaging and cultivate dialogic, meaning-making interactions that foster sustained cognitive and emotional engagement.

Conclusion

This study investigated the interplay between lecturers' basic teaching skills and student response patterns within WhatsApp-mediated learning environments in three Indonesian higher education classes. Anchored in Asril's (2011) teaching competencies and Hanifi and Rahayu's (2014) student response taxonomy, the findings demonstrated that lecturers most frequently employed Opening and Closing strategies, Further Questioning, and Reinforcement, while students commonly exhibited Independent and Obedient response types. When employed with pedagogical intent and structural coherence, these patterns suggest that WhatsApp can effectively support key instructional practices and foster learner agency.

The study contributes to mobile and informal learning discourse by empirically illustrating how conventional pedagogical frameworks can be adapted to asynchronous digital platforms. While the data revealed active learner engagement, superficial participation highlighted challenges associated with digital impression management. Specifically, the coexistence of independent and pretentious responses underscores the dual nature of WhatsApp learning environments: they promote autonomy and initiative while encouraging surface-level compliance for visibility. This contradiction highlights the importance of instructional scaffolding, which requires authentic, reflective contributions rather than performative activity.

Notably, the limited use of multimodal features and absence of differentiated instruction strategies—such as small group work—point to WhatsApp's structural constraints for fostering deeper interaction. The underuse of voice notes, despite their potential to enrich multimodal engagement, suggests contextual barriers such as connectivity and user confidence. This finding emphasizes the need for deliberate multimodal pedagogy, where lecturers integrate short audio, images, or collaborative tasks to diversify participation and support different learning preferences.

From a theoretical perspective, the findings are congruent with constructivist and connectivist learning theories (Siemens, 2005; Vygotsky, 1978) and rhizomatic models of knowledge development (Cormier, 2008). WhatsApp's decentralized, informal character can support learner autonomy and immediacy if paired with well-designed pedagogical scaffolding and feedback loops. As Garrison and Vaughan (2008) emphasized, it is not the technology that catalyzes engagement, but rather the educator's role in designing meaningful learning experiences.

Practically, the study underscores underscores three implications for higher education: (1) lecturers must be trained to design beyond transactional messaging by embedding higher-order prompts, structured debates, and peer feedback tasks; (2) multimodal tools such as voice notes and visual resources should be used strategically to strengthen cognitive and

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emotional engagement; and (3) hybrid integration of WhatsApp with formal Learning Management Systems (LMSs) can provide coherence and data tracking, while retaining the immediacy and accessibility of mobile interaction.

Despite these contributions, the study's scope was limited to a single course and relied solely on text and voice data, without incorporating student interviews or longitudinal engagement tracking. Future research should employ mixed-method designs, cross-course comparisons, and experimental interventions to examine the sustained efficacy of WhatsApp-based instruction.

Recommendation

To maximize WhatsApp's pedagogical value in higher education, it is essential to prioritize lecturer training in mobile pedagogy. Professional development initiatives should equip educators with the skills to design and facilitate meaningful learning experiences within mobile messaging platforms. This includes strategies for fostering cognitive engagement, encouraging dialogic interactions, and effectively utilizing multimodal communication tools such as voice notes, images, and shared files.

Another critical step is integrating WhatsApp with formal Learning Management Systems (LMSs). Such integration can enhance instructional coherence, streamline communication, and enable systematic data tracking. This hybrid model may help educators overcome the limitations of WhatsApp's informal structure by anchoring mobile interactions within a broader, curriculum-aligned digital ecosystem.

Instructors are encouraged to move beyond basic message exchanges by designing for deeper learning and collaborative engagement. Despite WhatsApp's linear interface, creative instructional approaches—such as asynchronous prompts, peer review tasks, and branching discussions—can simulate small group interactions and foster critical thinking. Leveraging WhatsApp's voice and visual features can further enrich student participation, accommodating diverse learning preferences and increasing multimodal interaction.

Additionally, future implementations should prioritize incorporating student feedback and learning analytics. Gathering insights into learner perceptions and tracking participation patterns can guide iterative refinements in instructional design and communication strategies. Finally, ensuring ethical and inclusive practices in mobile learning is vital. Institutions should establish clear guidelines on digital privacy, respectful interaction, and participation norms to promote equitable access and psychological safety in WhatsApp-mediated educational spaces.

These recommendations aim to transform WhatsApp from a supplementary communication channel into a dynamic, pedagogically sound platform that supports learner agency, instructional clarity, and inclusive engagement in mobile-first educational contexts.

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