

The Impact of Google Docs and Moodle on Academic Achievement Among Arab-Bedouin Students Learning Hebrew as a Second Language

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Abstract

This action research examines the impact of active learning through an online forum on academic achievement in Hebrew as a second language among Arab-Bedouin students, focusing on writing skills, linguistic accuracy, and collaboration. The study explores two case studies: (1) Google Docs, which enhanced student collaboration, real-time feedback, and knowledge retention, and (2) Moodle, which promoted active learning, structured knowledge construction, and digital literacy. Findings suggest that digital tools improve student engagement and writing skills but require structured teacher training. The study recommends integrating online collaborative learning into teacher education programs and establishing support frameworks for effective implementation of educational technologies.

Keywords: active learning, digital tools, collaborative learning, Hebrew as a second language, teacher training

1. Introduction

Technological advancements in recent decades have significantly transformed teaching and learning in academic settings. The integration of digital platforms into learning processes enables greater accessibility to educational materials, enhances interaction between learners and instructors, and improves language skills through collaborative work and real-time feedback (Shadiev & Wang, 2022). This study examines the impact of digital learning technologies on the development of writing skills in Hebrew as a second language among Arab-Bedouin students, focusing on the use of Google Docs and Moodle.

Learning Hebrew as a second language among Arab-Bedouin students presents unique challenges, arising from structural differences between Hebrew and Arabic, the influence of the mother tongue on academic writing, and difficulties in correcting linguistic and syntactical errors (Manor & Binhas, 2023). Mastery of Hebrew writing requires understanding vocabulary, sentence structure, and academically sound arguments (Abu-Gweder, 2025; Abu-Gweder & Solomovich, 2025). Given this context, digital collaborative tools can serve as a significant means of facilitating the learning process and improving academic writing skills (Alsubaie, 2022; Henkin, Gafer, & Abu-Rabiah, 2023).

While many studies focus on Hebrew language acquisition as a second language, this research specifically explores the impact of digital learning on the quality of academic writing among Arab-Bedouin students. The novelty of this study lies in its examination of the effectiveness of two widely used platforms—Google Docs and Moodle—in developing language skills, writing proficiency, and critical thinking (Wale & Kassahun, 2024). Google Docs provides opportunities for real-time collaborative work, allowing students to edit documents together, continuously refine their writing, and receive immediate feedback from instructors and peers (Alwahoub, Jomaa, & Azmi, 2022). Moodle, by contrast, provides a dynamic online learning environment where students can participate in in-depth discussions, critically engage with texts, and review course materials at their own pace (Jiang & Kalyuga, 2022). The combination of both platforms enhances students' writing abilities and critical thinking skills while also promoting a collaborative learning experience that encourages peer interaction and knowledge sharing. Collaborative learning through digital tools allows students to practice structured and continuous writing, receive high-quality feedback, and improve their language skills in a focused manner (Selfa-Sastre et al., 2022). Additionally, the use of these platforms encourages students to take responsibility for their learning, manage their time effectively, and operate independently within an online learning environment. However, digital learning is not without challenges—it requires pedagogical adaptation, appropriate technological training for both

instructors and students, and the creation of support frameworks to ensure active engagement of all learners (Alneyadi, Abulibdeh, & Wardat, 2023).

This study seeks to examine the effects of digital collaborative learning on Hebrew language acquisition among Arab-Bedouin students, with a particular focus on how Google Docs and Moodle enhance writing proficiency, student engagement, and critical thinking. The research explores how Google Docs supports real-time collaboration and feedback to improve second-language writing, how Moodle impacts writing quality and student participation, and the benefits digital platforms offer in developing argumentative writing skills. Additionally, it investigates the challenges Arab-Bedouin students face when using these technologies for Hebrew language learning.

This study explores the link between digital learning and second-language acquisition, offering practical insights for academic institutions looking to integrate technology into language instruction. More than just a theoretical discussion, the research sheds light on innovative ways to teach Hebrew and how digital collaboration can play a role in teacher training programs. By equipping future educators with advanced technological tools, the study aims to improve language learning strategies and keep students engaged in digital environments (Chan, 2024). At its core, it emphasizes the educational advantages of digital platforms and lays out a clear, practical framework for effectively teaching Hebrew as a second language.

The Role of Google Docs and Online Platforms in Academic Instruction

Technology is now a cornerstone of higher education, fundamentally changing how teaching and learning take place. As classrooms become increasingly digital, the role of educators is shifting. Instead of simply delivering knowledge, instructors are becoming mentors, facilitators, and partners in the learning process (Akram et al., 2022).

Integrating platforms such as Google Docs and online forums (Moodle) into teaching processes provides instructors with tools to enhance their teaching skills, improve content accessibility, promote active and collaborative learning, and foster a more dynamic academic discourse among students (Tiwari et al., 2023). These transformations highlight the need for training and adaptation among instructors to keep pace with rapid technological advancements (Huang et al., 2023; Gupta, 2022; Zhang, 2022).

The shift to technology-based teaching requires instructors to adopt new roles. In the past, their primary function was to deliver knowledge and dictate course content; today, they function as facilitators guiding students through their learning process (Liu & Zhou, 2023). Digital learning environments allow instructors to encourage independent learning and foster experiential learning, creating an active and collaborative dialogue among students and between students and instructors (Matalka et al., 2024).

When students participate in online forums, the dynamic of classroom discussions changes. Instead of instructors leading every conversation, students step up—asking questions, exchanging ideas, and supporting one another. This shift moves away from the traditional model where the teacher is the sole source of knowledge and instead positions them as a mentor. In this role, instructors help students sharpen their critical thinking, refine their text analysis skills, and improve their academic writing, fostering a more interactive and independent learning environment (Sanda, 2022; Daniel et al., 2024).

Despite the benefits of advanced learning technologies, research indicates that many educators have yet to fully leverage their capabilities. Studies categorize the adoption of technological innovation in educational settings into three phases. The Implementation Phase marks the initial introduction of technology, often limited to logistical improvements without significant pedagogical impact (Choi-Lundberg et al., 2023). In the Transition Phase, technology is integrated into remote learning, yet it does not fundamentally reshape teaching and learning methods (Ali et al., 2023). The Transformation Phase signifies a major pedagogical shift, incorporating interdisciplinary courses and innovative teaching strategies to foster active digital learning (Roy et al., 2022; Pillai et al., 2023).

The adoption of educational technology varies widely among instructors and is shaped by factors such as their digital literacy, the extent of institutional support, and the broader academic teaching culture. Consequently, many instructors continue to use digital tools in ways that reinforce traditional methods rather than reimagining learning experiences (Sayaf et al., 2022). For instance, pre-recorded lectures are often uploaded without fostering interactive discussions, and online forums are used merely as passive messaging boards rather than platforms for meaningful academic engagement (Porkodi et al., 2024; Tyagi & Krishankumar, 2023; Saleh et al., 2022).

The Contribution of Google Docs and Online Forums to Academic Instruction

The use of Google Docs and Moodle forums has reshaped the way instructors engage with students and manage learning. These tools make it easier to collaborate in real time, organize discussions, and streamline the flow of information, ultimately enriching the educational experience.

Google Docs provides a dynamic workspace where students and instructors can simultaneously edit documents, give and receive feedback, and track writing progress, fostering continuous improvement in academic writing (Shehzad & Charles, 2023). Moodle forums create an organized space for students to exchange ideas, ask meaningful questions, and sharpen their critical thinking with guidance from instructors (Kipling et al., 2022). Beyond facilitating discussion, these forums empower students to take charge of their learning by engaging in conversations that deepen their understanding (Du et al., 2022).

A major benefit of these digital platforms is their ability to store and structure academic content effectively. Discussions, assignments, and instructor feedback remain accessible, allowing students to manage their time more efficiently and revisit materials whenever needed (Macfarlane et al., 2022). This is particularly valuable in asynchronous learning environments, where flexibility is key. Moreover, tools like Google Docs and Moodle forums play a crucial role in enhancing digital literacy for both students and educators.

Instructors must integrate innovative teaching methods that align with the evolving technological landscape, ensuring that students acquire essential digital competencies (Getenet & Tualaulelei, 2023). The incorporation of interactive technologies into higher education further enhances engagement and learner participation, especially in online settings where maintaining student motivation can be challenging (Cai et al., 2023).

Challenges in Implementing Technology in Teacher Training

Despite the many advantages of digital learning, several key challenges hinder its full integration into teacher training programs. First, many instructors lack digital proficiency, leading to reluctance to use technology due to insufficient training or fear of changing traditional teaching methods (Elsayary, 2023; Peters et al., 2022). Additionally, technical and infrastructural limitations in higher education institutions make it difficult to implement advanced learning technologies due to a lack of resources and adequate technical support (Rawal, 2024; Dahri et al., 2023). Another challenge is low student engagement—when online platforms are not effectively managed, students may perceive them as secondary tools and engage passively (Sáiz-Manzanares et al., 2022). To adapt assessment strategies for digital learning, educators must develop fresh evaluation approaches that genuinely capture the essence of collaboration and interaction in online environments (Knie et al., 2022).

To overcome these challenges, educational institutions should allocate resources to train instructors in the proficient use of platforms like Google Docs and Moodle. Establishing support frameworks will help instructors learn how to integrate these technologies meaningfully, rather than merely as passive auxiliary tools (Sadiq et al., 2024; Tawafak et al., 2023). To prepare educators for the evolving demands of digital learning, it's essential to develop teaching methods that foster active engagement, collaboration, and critical thinking (Sáiz-Manzanares et al., 2022). Embracing advanced learning technologies in teacher training programs not only strengthens academic instruction but also ensures that educators are equipped to create dynamic and effective learning experiences. A well-executed combination of Google Docs and online forums can improve the student learning experience, encourage active intellectual engagement, and provide instructors with advanced teaching and assessment tools (García-Martín et al., 2023; Khatser & Khatser, 2022).

The Contribution of Google Docs and Online Forums to Teacher Training

Integrating digital technologies in teacher training significantly enhances teaching and learning processes while adapting to the changing educational landscape (Elsayary, 2023). Instructors at teacher training colleges can leverage digital tools such as Google Docs and Moodle forums to encourage collaborative learning, develop innovative assessment methods, and increase student engagement (Lorenz et al., 2022).

Technology is no longer just a supporting tool in education—it's transforming the way students learn and engage with course material (Intra et al., 2023). The use of platforms like Google Docs and Moodle forums has significantly changed how instructors and students interact, making the learning process smoother and more dynamic. These tools allow for real-time collaboration, structured discussions, and seamless knowledge-sharing, creating a richer and more interactive educational experience (Abdulmunem, 2023).

One of the biggest benefits of Google Docs is its ability to track previous versions of a document, giving instructors insight into how students develop their ideas and refine their writing over time (Rawal, 2024). This feature makes it easier to monitor progress, offer timely feedback, and guide students through the learning process. The ability to add comments and suggest edits not only helps improve final submissions but also fosters a mindset focused on growth and continuous improvement (Alferez-Pastor et al., 2023).

Moodle forums, on the other hand, provide a space for discussion-based learning where students can engage in meaningful academic conversations. Instructors can use these forums to spark debates, encourage critical thinking, and challenge students to analyze texts and articulate their perspectives in a structured way (Ngao et al., 2022). By integrating these tools into their teaching, educators create a more engaging and student-centered learning environment, better suited

to the demands of today's educational landscape.

One effective method is using the forum as a reflective learning tool, where students write and share insights, provide peer feedback, and contribute relevant course content (Knie et al., 2022). These platforms also allow students to practice self-assessment skills, learning how to refine their writing through peer feedback and instructor guidance (Imamyartha et al., 2023).

Another key benefit of integrating these tools into teacher training is their potential to enhance reflective practice. Instructors can use forums and Google Docs to create digital reflective journals, where students document their teaching experiences, analyze lessons they conducted, and describe their challenges and successes (Vieira et al., 2022). This approach directly connects theory with practice, which is essential in teacher education (Heinrich et al., 2022).

Beyond collaborative learning, instructors can incorporate these digital tools into innovative assessment processes. Online forum-based assessments allow students to take integrative exams that combine digital sources, academic articles, presentations, and external learning materials (Megli et al., 2023). Such assessments evaluate not only students' knowledge but also their ability to gather, analyze, and present information effectively (Ho, 2024). Instructors can build digital exam repositories, serving as future learning tools for both students and faculty (Bojiah, 2022).

Furthermore, online forums provide continuous learning opportunities beyond the classroom. Activities such as participation in discussions, analysis of educational content, and sharing of presentations and articles facilitate extended learning and in-depth discussion (Du et al., 2022). Students can upload videos, attach links to external sources, and respond to their peers—all within a flexible and asynchronous learning environment (Martin, 2022).

Despite these advantages, one of the primary challenges in using these technologies is the digital divide among instructors (Shehzad & Charles, 2023). Lack of experience with advanced technologies, along with insufficient training from academic institutions, can lead to discomfort and even resistance among some instructors (Alenezi et al., 2023). The main concern is a loss of control over the learning process, particularly as students become active participants in content creation (Amirova et al., 2023). To address this challenge, institutions should provide comprehensive training and ongoing support when integrating these technologies into teaching (Flanigan et al., 2022).

2. Research Methodology

Research Type

The present study is an Action Research, aiming to examine whether active learning through an online forum can improve academic performance in Hebrew as a second language among Arab-Bedouin students, with a particular focus on enhancing writing skills, linguistic accuracy, and critical text comprehension. Action research allows for an in-depth analysis of educational interventions in real time, enabling the refinement of teaching practices based on the findings obtained (Zangerle, 2023).

Research Method and Data Collection

The study employs a qualitative research method, utilizing structured observations, interaction analysis within an online forum, and reflective questionnaires. These methods were chosen to identify learning and behavioral patterns in the forum and to examine their influence on the students' language skills development (Creswell & Poth, 2018).

Research Instruments

The study employed three complementary methods to examine students' participation in the online forum. First, observational analysis of the forum interactions documented patterns of engagement, types of messages shared, and the nature of student interactions with peers and instructors, drawing on the framework of Kumi (2023), who analyzed online forums through a social network analysis perspective. Second, personal reflection questionnaires were used to capture students' perceptions of their learning experience, including their sense of belonging to the online learning community and the forum's perceived contribution to their language development (DiGiacomo et al., 2023). Finally, a content analysis of the forum messages was conducted to assess the level of engagement, academic language use, linguistic accuracy, and writing strategies, based on the analytical framework proposed by Hew and Cheung (2013).

Research Procedure

The study was conducted in three main phases. In the initial phase, students received training on how to use the forum as a collaborative learning tool, aimed at enhancing their writing and academic discourse skills (Laurillard, 2012). The intervention phase involved active participation in forum-based activities throughout the semester, where students engaged in structured discussions, uploaded writing drafts, and received feedback from both peers and instructors (Ellis, Goodyear, & Prosser, 2019). Finally, in the evaluation phase, students' progress in writing skills, engagement levels, and attitudes toward the forum were assessed, along with an analysis of the factors influencing their participation (Jonassen, 2014).

Data Analysis Method

The data was analyzed using Qualitative Content Analysis, following thematic categorization based on Creswell and Poth (2018). The analysis process involved identifying key themes in forum messages, coding and classifying data according to categories such as engagement levels, discussion depth, and writing improvement, and comparing findings among students with varying levels of participation. This approach provided insights into how different levels of engagement influenced students' learning experiences and academic progress within the online forum.

Ethical Considerations

The study adhered to academic ethical standards, ensuring the anonymity and privacy of the students. All participants provided informed consent for their participation in the study.

Research Findings

This chapter presents key findings based on interviews, classroom observations, and digital activity analysis, focusing on two case studies—Google Docs and Moodle. These platforms fostered collaboration, digital literacy, and reflective practice, supporting the development of professional identity among preservice teachers, many of whom began with limited tech experience. Beyond skill-building, the tools encouraged inclusive, dialogic learning that empowered students to take ownership of their learning. The chapter illustrates how thoughtfully integrated digital tools can bridge theory and practice, enhance student agency, and support essential academic and professional competencies for future educators.

Case Study 1: Google Docs as a Collaborative Learning Tool

The implementation of Google Docs in collaborative learning environments significantly influenced the way students interacted, constructed knowledge, and developed academic writing skills. The findings revealed four dominant themes across the interviews and classroom observations: development of collaborative competencies, enhancement of academic writing through feedback, improved knowledge retention and organization, and increased digital literacy.

1. Development of Collaborative Competencies

Across interviews, a recurring sentiment was the gradual enhancement of students' ability to collaborate effectively. Eleven out of fifteen participants reported that prior to the intervention, they had limited experience with shared writing tasks. However, after several weeks of using Google Docs, students began to divide responsibilities, discuss drafts openly, and co-edit in real time. For example, Amira noted, "At first, I found it challenging... but over time, I learned how to coordinate tasks." This was echoed by Malik, who stated, "Now, we argue less and listen more because we can see each other's comments and build on ideas together." Such responses reflect a growing sense of collective ownership and accountability.

2. Feedback as a Learning Catalyst

Thirteen students emphasized the value of real-time instructor feedback. Unlike traditional methods where feedback is delayed or delivered post-submission, Google Docs enabled synchronous input. Noha mentioned that "getting comments while writing helped me rethink my ideas immediately." Similar responses from peers, including Dalia and Mohammed, revealed that this dynamic fostered deeper engagement with their writing and encouraged reflection and revision, which aligns with pedagogical research on formative assessment.

3. Knowledge Retention and Academic Organization

The tool's archive function allowed students to revisit past versions and track their progress. This feature was mentioned positively by nine students. Sara, for instance, appreciated being able to "go back to old documents" to observe her academic development. Others, like Yasmin and Omar, highlighted the value of having all resources in one place, aiding in exam preparation and project planning.

4. Digital Literacy and Professional Readiness

Students across the board acknowledged that the experience contributed to their digital competence. Prior to the course, many used digital tools primarily for communication; after the intervention, they reported increased confidence in creating structured academic content. Aliya reflected, "I used to rely on handwritten notes. Now, I'm comfortable working in digital formats, which is essential for teaching." This aligns with broader trends in teacher education emphasizing 21st-century skills.

In conclusion, These findings, grounded in a range of student testimonies and consistent classroom observations, underscore the multifaceted pedagogical impact of collaborative digital tools like Google Docs. Far from isolated anecdotes, the patterns identified across the dataset reinforce the argument that such tools can play a transformative role in academic writing, teamwork, and digital preparedness for future educators.

Research Findings: Case Study 2 – Moodle as a Digital Learning Platform

The implementation of Moodle within the teacher training program revealed a multi-layered impact on students' academic,

technological, and reflective capacities. Thematic analysis of student interviews, course artifacts, and Moodle activity logs yielded six key themes: enhanced academic discourse, collaborative engagement, digital literacy development, independent learning, critical thinking, and long-term knowledge preservation.

1. Enhanced Academic Discourse and Reflective Dialogue

Students consistently reported that Moodle's discussion forums created a safe and structured space for engaging with course content and with peers' perspectives. This interaction fostered a deeper understanding of the material and improved their ability to articulate ideas in writing. Over 87% of the participants indicated that responding to classmates' posts encouraged them to consider alternative viewpoints and develop reflective arguments. For instance, Hind shared, *"The discussions in Moodle were insightful and opened up new ways of thinking."* This was further supported by discourse analysis showing that over 60% of the student posts included evidence of peer reference and critical engagement.

2. Collaborative Engagement and Active Learning

Collaborative tasks such as co-writing reflections, analyzing digital tools, and summarizing pedagogical articles promoted a sense of shared responsibility. 12 out of 15 students emphasized the importance of group assignments in fostering accountability. Yasmin reflected, *"It made me feel like I was truly part of the learning process."* Course data shows that group submissions had a 40% higher on-time completion rate compared to individual assignments, suggesting increased motivation.

3. Development of Digital Literacy

Nearly all students began the course with limited technological proficiency. Working with Moodle, alongside integrated tools like Google Docs and embedded videos, improved their competence. Bayan expressed, *"I wasn't proficient before, but Moodle forced me to learn."* Log analysis confirmed a marked increase in user-initiated activity over time, indicating growing confidence and autonomy.

4. Independent Learning and Time Management

Moodle enabled students to access resources independently and manage deadlines. Nermin noted, *"It taught me to be more responsible for my learning."* Usage analytics showed a positive correlation between time spent on the platform and assignment performance, reinforcing the role of structured digital environments in promoting self-regulated learning.

5. Critical Thinking Development

Assignments that required synthesis, evaluation, and reflection were repeatedly mentioned as key to intellectual growth. Ghadir stated, *"Moodle assignments made me look at things more deeply."* Coded responses revealed frequent use of analytical verbs ("evaluate," "question," "compare") in student reflections, supporting this claim.

6. Sustainability and Knowledge Continuity

The course archive, accessible to future cohorts, was praised by students like Khadija, who said, *"Our learning has value even after the course ends."* Instructors reported reusing student-generated content as teaching aids, underlining Moodle's potential for sustainable knowledge building.

In conclusion, While student testimonials provide rich qualitative insight, triangulation with usage data and content analysis reinforces the credibility of the findings. The use of Moodle and Google Docs not only supported academic growth but also contributed meaningfully to the professional formation of future educators. However, the study also highlighted the need for structured digital training to ensure equitable engagement. As Omar and Marwan noted, these tools should be embedded into routine teaching practices, not treated as isolated experiments.

3. Discussion and Conclusions

The findings of this study underscore the transformative impact of integrating Google Docs and Moodle into teacher education programs for Arab-Bedouin preservice teachers, particularly those learning Hebrew as a second language. These digital platforms not only enhanced collaborative writing, academic literacy, and reflective thinking, but also served as inclusive tools for linguistic and professional empowerment. This aligns with the work of Alwahoub, Jomaa, and Azmi (2022) and Alsubaie (2022), who emphasize the benefits of collaborative tools in developing writing fluency through real-time peer and instructor feedback. In our study, students reported increased confidence in writing and improved engagement with the writing process, echoing similar conclusions from Henkin, Gafer, and Abu-Rabiah (2023), who identified syntactic improvements among Arabic-speaking students writing in Hebrew.

Moodle, as a learning management system, contributed to fostering asynchronous dialogue, critical engagement, and independent learning. Students appreciated the structured forums, which supported peer reflection and thoughtful academic discourse, confirming the findings of Ho (2024) and Heinrich, Thomas, and Kahu (2022) about the importance of digital platforms in promoting dialogic learning. For many participants, Moodle served not only as a pedagogical tool but also as a

mechanism for self-regulated learning, a key competency in modern teacher education (see Bojiah, 2022; Abdulmunem, 2023). Importantly, this study brings a unique perspective by focusing on Arab-Bedouin female students, an underrepresented group in educational technology research. Prior studies, such as Abu-Gweder (2023; 2024), have highlighted the linguistic challenges these students face when navigating between Literary Arabic and Hebrew. This research expands on that work by demonstrating how digital collaboration tools can mitigate those challenges, enhance writing accuracy, and foster agency among students operating within complex sociolinguistic contexts.

The study also affirms the need for structured digital pedagogies that accommodate varying levels of digital literacy (Manor & Binhas, 2023), and calls for culturally responsive strategies that ensure equitable access to learning technologies. By embedding real-time feedback and scaffolded activities, educators can support the professional identity development of minority preservice teachers and bridge the gap between traditional instruction and digital innovation in multilingual, multicultural settings.

Recommendations and Future Research

To maximize the benefits of digital tools in teacher training, institutions should invest in comprehensive faculty training programs. This study suggests that the successful adoption of Google Docs and Moodle requires instructors to develop digital competencies, which is supported by studies emphasizing the need for professional upskilling in digital pedagogy (Alfárez-Pastor et al., 2023; Alenezi, Wardat, & Akour, 2023).

Future research should explore long-term effects of digital collaborative learning on students' academic writing proficiency. Additionally, investigating the role of AI-driven feedback tools within Google Docs and Moodle could provide further insights into optimizing digital learning environments (Wale & Kassahun, 2024). Another promising direction is examining how these technologies can be integrated with adaptive learning platforms to personalize second-language instruction based on individual student needs.

4. Conclusion

The integration of Google Docs and Moodle into teacher training programs significantly contributes to collaborative learning, critical thinking, and second-language acquisition. The study underscores the importance of structured digital interventions in overcoming linguistic challenges and fostering self-directed learning among Arab-Bedouin students. By aligning findings with established research and identifying new insights specific to this demographic, the study offers both theoretical and practical contributions to digital pedagogy. Implementing these recommendations will ensure that digital learning tools become a staple in effective teacher training, preparing educators to navigate and leverage the evolving educational landscape.

5. Limitations

This study has several limitations that should be considered when interpreting its findings. First, the research focuses primarily on Arab-Bedouin students, limiting generalizability to other cultural and linguistic groups. Second, the study relies on self-reported data, which may introduce bias due to participants' subjective perceptions. Third, while the study examines the effectiveness of Google Docs and Moodle, it does not account for external factors such as institutional support, internet accessibility, and varying levels of digital literacy among instructors. Lastly, the research does not measure long-term outcomes, highlighting the need for further studies to assess the sustained impact of digital tools on teacher training and student performance.

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Data sharing statement

No additional data are available.

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