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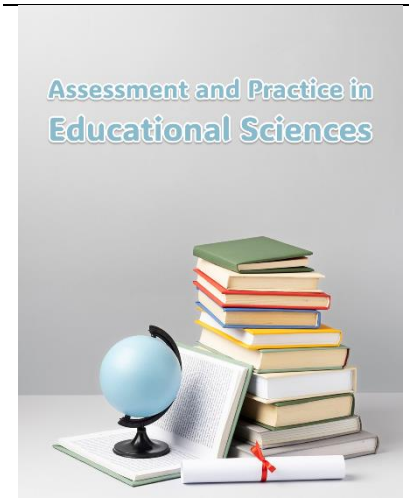

Blended Learning and Student Outcomes: A Qualitative Study of Teachers' Lived Experiences

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ABSTRACT

This qualitative study aimed to explore and analyze the lived experiences of teachers implementing blended learning (combining in-person and virtual modalities) to enhance student engagement and academic achievement. Adopting an exploratory design and employing thematic analysis, the study involved female elementary school teachers in Mazandaran Province, Iran. Participants were purposefully selected through snowball sampling. Data were collected via semi-structured interviews with 15 teachers conducted in school settings, continuing until theoretical saturation was reached. To ensure the trustworthiness of the findings, both participant validation and expert review were employed. Data analysis yielded six major themes contributing to improved student engagement and academic outcomes: (1) quality of in-person and virtual teaching, (2) promotion of deep learning, (3) effective instructional strategies, (4) influence of the learning environment, (5) professional development and teacher training, and (6) cultural and social factors. Furthermore, 17 sub-themes were identified, including the use of blended learning tools, technology interaction, diverse learning resources, active teaching methods, learning environment design, and adaptation to students' individual characteristics.

Keywords: Teachers lived experiences, blended learning, student outcome, qualitative study

Introduction

In recent years, educational systems worldwide have undergone profound transformations driven by rapid advancements in educational technologies and significant socio-cultural changes. Among these transformative approaches, blended learning—integrating traditional face-to-face instruction and virtual online modalities—has emerged as a prominent pedagogical model designed to capitalize on the benefits inherent in both methods. The face-to-face component facilitates dynamic interpersonal interactions and immediate feedback, central to traditional education, while the virtual component affords unprecedented flexibility, accessibility, and personalization of learning experiences. Nevertheless, the successful adoption of blended learning is multifaceted, influenced by factors spanning technological infrastructure, instructional design, student readiness, and notably, teachers' expertise and experiences, who remain pivotal agents in the realization of effective learning (1-3).

The onset of the COVID-19 pandemic in 2020 marked a defining moment exacerbating the urgency to adopt blended learning globally. School closures necessitated rapid shifts to online platforms, exposing both the potential and limitations of virtual education. In the subsequent transition phases, many educational systems opted for blended models rather than reverting exclusively to conventional classroom modalities, seeking to harness the flexibility and resilience that blended approaches offer (4, 5). The integration of both learning environments aims to provide continuous learning pathways, yet teachers' preparedness to navigate this complex dual modality critically determines its efficacy. Research has consistently underscored that beyond the mere availability of technology and platforms, the pedagogical competence and adaptive strategies of teachers in blended settings dictate the quality of student engagement and academic outcomes (1-3).

Student engagement, encompassing cognitive, emotional, and behavioral dimensions, is recognized as a fundamental construct associated with effective learning and heightened academic achievement (6). Engagement manifests through students' motivation, participation, and persistence across learning activities, which blended learning environments aim to foster through adaptive synchronous and asynchronous interactions. Nonetheless, the transition to online and blended formats unveils challenges such as social isolation, reduced motivation, and inequities related to access and digital literacy, which can undermine sustained participation (7, 8). Teachers hence bear the responsibility to mediate this milieu, designing inclusive and stimulating learning experiences that bridge virtual and physical spaces, ensuring no learner is marginalized (9, 10). Their lived experiences provide invaluable insights into the enablers and barriers encountered in this hybrid educational scenario.

Academic achievement, typically operationalized through measurable indicators such as grades, skill mastery, and conceptual understanding, remains the ultimate objective of educational endeavors. A growing body of evidence supports that blended learning, when thoughtfully implemented, can surpass the efficacy of purely face-to-face or online approaches by leveraging flexibility, resource accessibility, and opportunities for self-regulated learning (11, 12). For instance, the capacity to revisit recorded lessons or access diverse materials contributes to deeper comprehension and retention. Nonetheless, educators encounter mixed experiences; positive outcomes often correlate with integration of advanced digital tools such as artificial intelligence for personalized feedback, while challenges include elevated workloads, technological disparities, and time management complexities (13, 14). The heterogeneity in teachers' experiences underscores the need for context-aware strategies and institutional support to optimize blended learning benefits.

The context of Iran illustrates these complexities vividly. Following periods of exclusively virtual education induced by the pandemic, Iranian schools have increasingly incorporated blended learning as a sustainable pedagogical model. However, systemic challenges persist, including insufficient digital infrastructure, unequal access among students, and gaps in structured curricula tailored to blended modalities (4, 15). Such constraints affect instructional quality, student engagement, and learning outcomes. Nevertheless, some teachers’ successful integration of online tools to complement face-to-face instruction exemplifies the untapped potential, contingent on targeted support and capacity-building initiatives (4, 5).

Expounding on the crucial role of the teacher, research emphasizes that teacher quality critically influences student success, especially at foundational education levels such as primary schools where developmental trajectories are highly sensitive to educational inputs. Traditional pedagogical roles have evolved in blended environments; teachers not only dispense knowledge but also act as facilitators and co-constructors of learning, requiring enhanced digital fluency and adaptive pedagogical skills (10, 16). Compounding this transition are cultural and administrative factors shaping teachers' creativity and efficacy in virtual spaces (17, 18), alongside social-emotional challenges such as motivation deficits and psychological pressures intensified by abrupt shifts to online learning (5).

Empirical studies exploring teachers' perceptions during the pandemic reveal mixed sentiments. While virtual education fostered increased collaboration among educators and motivated them to improve media literacy and creativity, infrastructural

limitations and insufficient training engendered apprehensions about teaching efficacy and student engagement (10, 19, 20). In higher education contexts globally, challenges such as limited personal contact, lack of student interest, and interaction deficits have been documented, further highlighting the complexity of adapting pedagogies to virtual and blended formats (2, 21). These insights stress the indispensability of professional development focused on digital competencies and blended instruction methodologies (2, 8).

Effective blended learning management requires a systematic and integrated approach encompassing educational technologies, dynamic content design, diversified assessment techniques, and ongoing quality assurance (3). The deployment of multimedia resources, active learning strategies, web-based learning management systems, and videoconferencing tools serves to amplify engagement and knowledge acquisition (22, 23). Moreover, learners' diverse developmental, emotional, and cognitive characteristics demand differentiated instruction and an adaptive learning environment that fosters equity and accessibility (9, 24).

The professional development of teachers emerges as a cornerstone for the successful implementation of blended learning. Training that enhances teachers' pedagogical and technological skills, alongside fostering reflective practices, is imperative to elevate teaching quality and student achievements (1, 8). Additionally, cultural and social contextual factors invariably influence blended learning outcomes. Economic disparities, psychological stressors, and family support levels shape both teachers' and students' engagement in virtual environments, underscoring the necessity for holistic policies that address these dimensions (5, 9, 17).

Considering these dynamics, investigating teachers' lived experiences offers rich, contextualized understanding essential for refining blended learning models. Qualitative inquiries reveal nuanced perspectives on instructional quality, use of educational technology, deep learning promotion, strategic teaching, environment design, and the interplay of cultural-social factors (1, 5, 25). The primary aim of this study is to explore and analyze elementary school teachers' lived experiences with the implementation of blended learning, focusing on its effects on student engagement and academic achievement, in order to inform effective pedagogical strategies and support mechanisms in blended educational environments.

Methods and Materials

This research was conducted in a qualitative manner with an exploratory approach using thematic analysis. The participants in the research included female elementary school teachers in Mazandaran province, Iran, and purposive sampling and interviews with teachers were conducted in the school environment, and the interviews continued until theoretical saturation of the data. The inclusion criteria for the study were: female teachers residing in Mazandaran province, formal employment in elementary school, having at least 5 years of teaching experience, and a virtual teaching program in virtual networks as blended learning. The tool used to discover the lived experience of teachers was semi-structured interviews so that school teachers could freely express their views and opinions. The text of the interview sessions was implemented in writing and supplemented by note-taking during the interview sessions. The data obtained from the interviews were analyzed using the coding, compilation, and content analysis methods. In the next stage, by carefully studying the texts, initially for each of the interviews prepared, all independent ideas were identified in the form of basic themes, and then each was given a specific code and used as an indicator. Then, based on the Clark and Brown (2006) model, more general categories were made of all the basic themes identified in the entire research, which led to the identification of organizing themes, and finally the organizing themes were classified in the form of a comprehensive theme. In order to achieve the accuracy and validity of the study, validity and reliability criteria were considered and used. By emphasizing the selection of an appropriate context, the alignment of data from interview results, research conducted in this field, and the opinions of the participants, as well as close and continuous participation and

interaction, and involving the participants in the interpretation, referring to them again, and also specifying the stages and the nature of the processes as clearly as possible in order to facilitate their review and understanding by others, this was addressed in order to ensure the validity and accuracy of the study as much as possible. Each of the codes and categories identified in this study was extracted from numerous quotes from many interviewees.

Findings and Results

In the present study, in order to reach the main themes, the interviewees were asked questions about their experiences, and for data analysis, the interview transcripts were reviewed several times, and the essential and key statements were determined according to the researcher's judgment, and irrelevant statements were eliminated. After extracting the themes, their content was analyzed, and the relationship of each theme with the teachers' lived experience of blended learning (face-to-face and virtual) in order to improve students' participation and academic achievement, as well as the assumptions and factors affecting the model were determined. Finally, the overall picture of the evaluation model was drawn based on the identified themes and the relationships between them (Table 1). In this regard, two examples of interview transcripts are given below, along with coding and sub-themes.

Table 1. Interview Excerpts and Initial Coding

Significant Statements	Initial Codes
"Alongside in-person teaching, we can use virtual education by sharing instructional videos to enhance student learning."	1. Using instructional videos to improve student learning
"When shy students hesitate to ask questions and have lingering doubts, I always post supplementary materials on the SHAD platform so those who missed class or didn't fully understand can benefit."	2. Uploading supplementary materials to SHAD platform
"Using personal computers, students can easily access lesson materials and use educational software to do more exercises to strengthen their skills."	3. Easy access to materials via personal computers; 4. More practice exercises using educational software
"Students face real, complex problems and get opportunities to reflect on similar challenges, ask questions, and collaboratively find solutions."	5. Students encountering real-world complex problems; 6. Opportunities for reflection, questioning, and collaborative problem-solving
"One method I use to keep students active is group discussions and Q&A sessions."	7. Using group discussions and Q&A to maintain student engagement
"I ask students to give presentations and create videos/photos about lesson topics for their classmates."	8. Student presentations and multimedia content creation
"Learning objectives should be set collaboratively with students, and the learning environment should facilitate this interaction."	9. Co-creating objectives with students; 10. Creating interactive learning environments
"I hold in-person sessions for clarification and immediate student feedback."	11. In-person sessions for clarification and instant feedback
"Teachers must understand students' strengths/weaknesses and assign exercises accordingly."	12. Teacher awareness of student strengths/weaknesses; 13. Tailoring assignments to student abilities
"We grew up in a master-apprentice culture, but education is shifting toward teacher-student collaboration in designing goals and methods."	14. Cultural tension between traditional and collaborative learning models
"Students with attention difficulties can't sustain long classroom sessions."	15. Challenges for students with attention disorders in prolonged classes
"To help students better understand lessons, I use videos and clips	16. Using educational videos/clips to enhance student comprehension
"Class sessions are recorded so students can download and review them later."	17. Recording class sessions for later student access
"With modern educational tools and access to vast information, students are no longer passive learners and can acquire knowledge anytime, anywhere about topics that interest them."	18. Access to extensive information through modern educational tools; 19. Transition from passive to active learning through technology
"I ask students to write short articles about the lesson and their questions."	20. Assigning short reflective articles to students
"Teachers should define curriculum objectives, create content, and consider factors affecting student learning."	21. Teacher's role in setting objectives, creating content, and considering learning factors
"Students at different ages have varying emotional and cognitive capacities that must be considered."	22. Accounting for developmental differences in emotional/cognitive capacities
"Quality online education requires necessary infrastructure like internet and computers."	23. Infrastructure requirements (internet/computers) for effective online education
"A successful teacher possesses professional knowledge about curriculum, learners, and teaching/learning methods."	24. Teacher's professional knowledge of curriculum, learners, and pedagogy
"Teachers should note that technology may cause student resistance or distraction due to complexity. Teacher attentiveness in this regard can improve teaching quality."	25. Student resistance to technology; 26. Technology-induced student distraction; 27. Teacher awareness of technology-related resistance/distraction

Note: SHAD refers to Iran's national online education platform (School Student Network). The translation maintains the original numbering system while adapting expressions for international academic audiences. Cultural references (like SHAD platform) are preserved with explanation.

Table 2. Identified Themes

Main Theme	Sub-Themes	Codes
Instructional Quality (Face-to-Face & Virtual)	Use of Blended Teaching Aids	1-2-16-18-36-57-71-81-105
Instructional Quality (Face-to-Face & Virtual)	Technology Integration & Utilization	3-4-28-43-44-51-80-85-113
Instructional Quality (Face-to-Face & Virtual)	Diversity of Learning Resources	17-45-72-94-100
Deep Learning	Interactive Tools	5-6-37-73-114
	Educational Software Applications	38-46-52-86
	Supporting Self-Directed Learning	19-47-58-88-101-106
	Active Teaching Methods	7-8-29-48-64-74-95
Effective Instructional Strategies	Student Engagement Techniques	6-9-20-30-50-102-115
	Emerging Educational Technologies	39-59-65-82
	Strategic Teaching Processes	12-21-87-96-107
Learning Environment Impact	Physical & Virtual Spaces	42-63-68-84-92-111
	Learning Environment Design	10-23-32-66-76-97-104-118
Professional Development & Teacher Training	Enhancing Blended Teaching Skills	11-27-41-52-78-79-108-112-117
	Professional Training & Support	24-31-53-61-70-75-83-89-90
Cultural & Social Considerations	Cultural Factors in Blended Learning	14-33-93-98-103-116
	Social Factors in Blended Learning	34-40-54-69-77-91-99-109
	Adaptation to Student Diversity	13-15-22-25-26-35-55-56-60-67

Following the thematic abstraction process, an organized model was developed based on these themes, as presented in Figure (1).

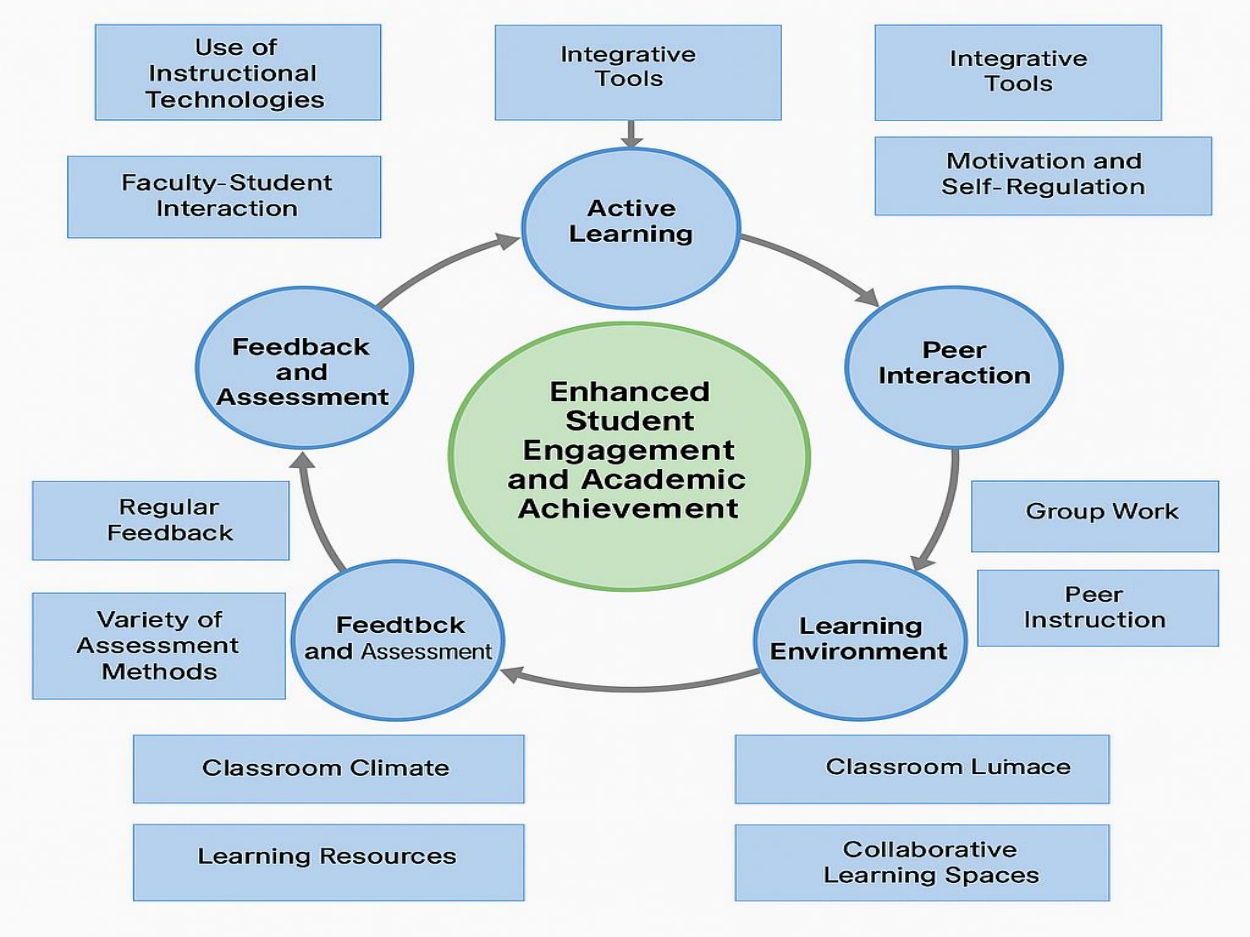

Figure 1. Thematic Organization Model of Categories and Themes

Discussion and Conclusion

This study explored the lived experiences of elementary school teachers implementing blended learning—combining in-person and virtual instruction—to enhance student engagement and academic achievement. Analysis yielded six major themes: quality of in-person and virtual teaching, promotion of deep learning, effective instructional strategies, influence of the learning environment, professional development and teacher training, and cultural and social factors. These findings provide a comprehensive understanding of the dynamics surrounding blended learning from the teachers' perspective, highlighting both opportunities and challenges.

Reporting and Explanation of Results

The first major theme, the quality of education in both face-to-face and virtual settings, revealed that blended learning capitalizes on diverse instructional tools and resources to improve student outcomes. Teachers emphasized the effectiveness of using multimedia tools such as educational videos, simulations, and interactive quizzes to engage students and cater to multiple learning styles. This aligns with previous evidence demonstrating that integrating varied digital resources fosters wider accessibility and deeper understanding of educational content (5, 19, 22). However, persistent infrastructural challenges such as limited access to technology and insufficient digital infrastructure pose barriers to maximizing this potential (4, 15).

A second prominent finding was the promotion of deep learning through active teaching methods supported by interactive tools and software applications. Teachers described facilitating student-centered activities like collaborative problem-solving, presentations, writing reflective articles, and engagement through technology-enabled platforms. This corresponds to research highlighting that deep learning involves critical thinking, metacognitive skills, and self-directed learning, all of which are strengthened by active participation and meaningful interaction (12, 23, 25). The study further supports that virtual components of blended learning, when coupled with active pedagogies, extend opportunities for flexible and self-paced learning, enhancing students' academic confidence and motivation (11, 19).

Effective instructional strategies formed the third essential theme, wherein teachers employed techniques such as personalized feedback, group discussions, and scaffolded assignments to foster student engagement. The strategic use of synchronous and asynchronous tools enabled educators to bridge the physical-virtual divide, which echoes findings that teacher preparedness and digital competence directly influence blended learning effectiveness (2, 8). The utilization of new educational technologies including AI tools for personalized feedback corroborates studies underlining technology's role in enhancing educational outcomes by adapting to individual student needs (13, 14).

The learning environment's impact, encompassing both physical and virtual spaces, was identified as a critical factor. Teachers highlighted that well-structured environments promoting safety, comfort, interaction, and equity contribute markedly to positive learning experiences. These insights align with research advocating for environments fostering relationship-building and collaborative culture to boost engagement and academic success (9). In blended settings, balancing social presence and cognitive presence across modalities is pivotal to sustain learners' motivation and participation (6).

Professional development and teacher training emerged as vital for equipping educators with pedagogical and technological skills adaptive to blended formats. The ongoing need for capacity-building reflected in participants' experiences supports existing literature emphasizing professional growth as a continuous cycle of reflection and practice essential to achieving improved student learning outcomes (1, 8). Financial support, incentives, and institutional backing were also noted as prerequisites for sustaining effective blended education (8).

Lastly, cultural and social considerations surfaced as influential in shaping blended learning efficacy. Teachers pointed to the necessity of addressing students' psychological pressures, family economic conditions, motivation levels, and social

support, which align with findings that socio-cultural contexts critically affect engagement and academic performance in virtual environments (5, 9, 17). Furthermore, the study corroborates that a flexible approach supporting diverse learning needs and backgrounds enhances inclusivity in blended education (16, 24).

Overall, the findings illuminate that the successful implementation of blended learning depends on synergizing diverse teaching modalities, instructional strategies, robust infrastructures, professional development, and cultural sensitivity. These align with studies advocating blended learning as a transformative educational model capable of promoting engagement and achievement when contextualized to teachers' lived realities (1-3).

This study carries limitations primarily linked to its qualitative design and context-specific focus. The sample comprised female elementary school teachers from Mazandaran Province, Iran, limiting the generalizability of findings to other regions, education levels, or male educators. Additionally, reliance on self-reported data through interviews introduces potential biases such as social desirability or selective memory. The rapidly evolving nature of educational technologies and policies also means findings may shift as these factors change. Lastly, the study's focus on teachers excludes direct insights from students and parents, which could have enriched understanding of blended learning dynamics.

Future research could expand the scope to include diverse geographic regions, education levels, and demographic groups such as male and rural teachers to improve representativeness. Quantitative or mixed-methods approaches may complement qualitative insights by measuring the magnitude of blended learning effects on engagement and achievement. Longitudinal designs would also be valuable to examine sustained impacts and evolution of teacher experiences over time. Additionally, exploring student and parent perspectives could provide a holistic view of blended learning's effectiveness and challenges. Investigating the role of specific emerging technologies, such as AI-driven tools, in personalized learning within blended settings also represents a promising avenue.

Educational institutions should invest in strengthening digital infrastructure and providing equitable access to technology for all students. Comprehensive professional development programs tailored to blended pedagogy are crucial, focusing on both technical skills and innovative instructional strategies. Encouraging collaboration and experience-sharing among teachers can foster a supportive community that drives continuous improvement.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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