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Utilizing Augmented Reality (AR) to Enhance Motivation and Writing Skills in Islamic Primary Education

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Abstract
This study explores the utilization of Augmented Reality (AR) as an innovative educational tool to enhance student motivation and writing skills in Islamic primary education. Traditional teaching methods often struggle to engage young learners in writing activities, which can limit their creative expression and language development. By integrating AR technology into the curriculum, this research aims to provide interactive and immersive learning experiences that stimulate interest, support comprehension, and encourage active participation. The study employs a mixed-methods approach, combining quantitative assessments of writing skill improvement with qualitative observations of student engagement and motivation. Preliminary findings suggest that AR-based learning not only increases students' enthusiasm for writing but also positively impacts their creativity, narrative coherence, and understanding of Islamic themes. The results highlight the potential of AR to transform conventional classroom practices, offering a model for technology-enhanced Islamic education that balances faith-based content with modern pedagogical strategies.

Keywords: Augmented Reality; classroom practices; Islamic education;

Introduction

Education in the twenty-first century faces an ongoing challenge: how to engage young learners effectively in a rapidly evolving digital landscape. This challenge becomes particularly pronounced in primary education, where foundational skills such as reading, writing, and critical thinking are established. Writing, as a fundamental component of literacy, requires not only technical proficiency in spelling, grammar, and structure but also creativity, motivation, and a sense of purpose. In Islamic primary education, writing takes on an additional dimension, as it often involves expressing ideas and narratives aligned with Islamic values, history, and ethics. Consequently, educators must find strategies that can both inspire students and enhance their writing abilities while staying true to the moral and spiritual goals of Islamic education.(Alam, 2020)

Traditional teaching methods, while effective in some contexts, frequently fall short in fostering sustained student engagement, especially when it comes to writing activities.

Conventional approaches often rely on rote memorization, repetitive exercises, and teacher-centered instruction, which may lead to boredom and low motivation among students. Many children struggle to connect personally with abstract writing assignments or find the process tedious, reducing both the quantity and quality of their written output. These limitations highlight the necessity of exploring innovative pedagogical strategies that can transform writing from a routine task into an interactive and meaningful experience.

One promising approach is the integration of Augmented Reality (AR) into the classroom. AR technology superimposes digital content, such as images, text, and animations, onto the physical environment, creating immersive and interactive learning experiences. Unlike traditional multimedia tools, AR allows students to interact with three-dimensional virtual elements in real-time, bridging the gap between abstract concepts and tangible experiences. In the context of writing, AR can provide visual prompts, interactive story scaffolds, and immersive narratives that stimulate creativity and support comprehension. For Islamic primary education, AR can incorporate culturally and religiously relevant content, such as Quranic stories, Islamic historical events, or moral parables, making learning both educational and spiritually meaningful (Supriyatno, 2020).

The use of AR in education aligns with constructivist learning theories, which emphasize that students learn best when they actively construct knowledge through exploration, problem-solving, and meaningful interaction with content. By embedding AR into writing lessons, educators can create learning environments that encourage curiosity, collaboration, and engagement. For example, students may interact with a 3D depiction of an Islamic story, explore its characters and setting, and then produce written narratives inspired by their immersive experience. This approach not only supports cognitive development but also nurtures intrinsic motivation, as students perceive writing as an enjoyable and purposeful activity rather than a compulsory exercise, (Suyadi, 2018).

Furthermore, AR has the potential to address diverse learning needs and styles. Primary school classrooms often include students with varying levels of writing ability, attention span, and learning preferences. AR provides multimodal stimuli—visual, auditory, and kinesthetic—that can cater to different learners, enhancing accessibility and inclusivity. For struggling writers, visual prompts and interactive elements can guide sentence construction, story sequencing, and vocabulary usage. For advanced learners, AR experiences can offer complex scenarios that challenge creativity and critical thinking. Such differentiation can help maintain engagement across the classroom, ensuring that every student has the opportunity to develop both skill and confidence in writing, (Abubakari, 2024).

In the context of Islamic education, integrating AR also offers unique opportunities for value-based learning. Writing activities can be designed around Islamic themes, such as the stories of the prophets, moral lessons, or ethical dilemmas, allowing students to internalize Islamic teachings while practicing literacy skills. The immersive nature of AR can make these narratives more vivid and memorable, enhancing comprehension and reflection. For instance, a student may explore a virtual mosque or historical site, engage with the environment through interactive prompts, and then compose a reflective essay or creative story inspired by the experience. Such activities not only improve writing proficiency but also foster spiritual awareness, moral reasoning, and cultural identity, (Lafrarchi, 2020).

Despite its potential, the application of AR in primary education—particularly within Islamic contexts—remains underexplored. While previous studies have highlighted the effectiveness of digital tools in enhancing motivation and learning outcomes, limited research has addressed how AR specifically can impact writing skills in young learners. Moreover, few studies have investigated the integration of AR with faith-based content, leaving a gap in understanding how technology can support both academic and spiritual development. This study aims to fill this gap by investigating the effects of AR-enhanced writing instruction on motivation and skill development in Islamic primary schools, (Gulson, 2012).

The study adopts a mixed-methods approach, combining quantitative and qualitative methods to provide a comprehensive understanding of AR's impact. Quantitative measures, such as pre- and post-tests of writing performance, allow for objective assessment of skill improvement, including vocabulary, grammar, narrative coherence, and creativity. Qualitative observations, interviews, and student reflections provide insight into motivation, engagement, and attitudes toward writing. Together, these methods offer a holistic view of how AR can transform writing education, revealing both measurable outcomes and experiential benefit. learnings.

Preliminary findings from related research suggest that AR can significantly enhance learning outcomes by making lessons more interactive, stimulating curiosity, and fostering active participation. Students who engage with AR-based learning report higher enjoyment, greater interest in tasks, and increased willingness to take risks in their writing. In the context of Islamic primary education, AR can similarly enhance engagement by contextualizing writing within culturally and religiously meaningful narratives, providing a sense of purpose that extends beyond academic achievement (Castro, 2021).

The integration of AR also aligns with broader educational trends emphasizing technology-enhanced learning and 21st-century skills. Modern education calls for innovative pedagogies that prepare students for complex, digitalized societies while maintaining cultural and ethical grounding. In Islamic education, this means balancing technological innovation with moral and spiritual development. AR provides a practical tool for achieving this balance, enabling educators to deliver content that is simultaneously engaging, educational, and value-driven.

In conclusion, the utilization of Augmented Reality in Islamic primary education represents a promising avenue for enhancing both motivation and writing skills. By providing immersive, interactive, and meaningful learning experiences, AR has the potential to transform conventional writing instruction, making it more engaging, accessible, and aligned with students' cognitive, creative, and spiritual needs. This study seeks to explore the practical applications and outcomes of AR-based writing interventions, contributing to the growing body of research on educational technology and offering insights for educators seeking to integrate innovation with faith-based pedagogy. The findings are expected to demonstrate that AR not only supports the development of technical writing skills but also fosters intrinsic motivation, creativity, and a deeper connection to Islamic teachings, ultimately offering a model for holistic, technology-enhanced education in primary schools.

Research Method

This study employs a mixed-methods research design to examine the effectiveness of Augmented Reality (AR) in enhancing motivation and writing skills among students in

Islamic primary education. The mixed-methods approach combines quantitative and qualitative techniques to provide a comprehensive understanding of both measurable learning outcomes and the experiential aspects of student engagement. This design allows for triangulation of data, increasing the validity and reliability of the research findings.

Participants

The participants in this study include students from Islamic primary schools, specifically targeting grades 4–6, where foundational writing skills are being further developed. A purposive sampling method is used to select classrooms with access to AR technology and teachers willing to integrate AR-based instruction into their writing curriculum. Approximately 60 students from two different schools are included, ensuring a diverse sample in terms of writing ability, motivation levels, and prior exposure to digital learning tools. Teachers involved in the study also participate in interviews to provide insights into pedagogical strategies and classroom dynamics.

Instruments

Several instruments are utilized to collect both quantitative and qualitative data:

1. Writing Performance Tests – Pre- and post-tests are administered to evaluate students' writing skills. The assessment criteria include vocabulary usage, grammatical accuracy, sentence structure, narrative coherence, creativity, and the integration of Islamic themes in writing tasks.
2. Motivation and Engagement Questionnaire – A Likert-scale questionnaire is designed to measure students' intrinsic and extrinsic motivation toward writing, as well as their engagement with AR-based learning activities.
3. Observation Checklist – Classroom observations are conducted using a structured checklist to record student behaviors, participation levels, collaborative interactions, and responsiveness to AR learning activities.
4. Interviews and Reflections – Semi-structured interviews with students and teachers provide qualitative data on perceptions, experiences, and attitudes toward AR-enhanced writing lessons. Students are also encouraged to submit reflective journals describing their learning experiences and challenges during the AR activities.

Procedure

The research is conducted in three main phases:

1. Preparation Phase – AR-based instructional materials are developed in collaboration with teachers and educational technologists. These materials incorporate Islamic themes, including stories from the Quran, historical narratives, and moral parables, presented through interactive 3D visuals and animations. Teachers are trained on integrating AR into their writing lessons, focusing on both technical operation and pedagogical strategies.
2. Implementation Phase – The AR-based writing instruction is implemented over a period of six weeks. Each week, students participate in interactive AR activities that serve as prompts for writing exercises. For example, students may explore a virtual depiction of an Islamic historical event and then write a narrative recounting or reflection based on the experience. Teachers facilitate the sessions, guide students in writing tasks, and encourage discussion and collaboration. Pre-tests on writing skills and motivation are administered before the intervention to establish a baseline.

3. Evaluation Phase – At the end of the intervention, post-tests are administered to assess improvements in writing skills. The motivation and engagement questionnaire is also re-administered to measure changes in students' attitudes toward writing. Classroom observations are conducted throughout the intervention period to capture real-time engagement and interaction with AR materials. Interviews and student reflections are collected at the end of the study to provide qualitative insights into the perceived effectiveness, challenges, and benefits of AR-based instruction.

Data Analysis

Quantitative data from writing tests and questionnaires are analysed using descriptive and inferential statistics. Paired sample t-tests are conducted to determine significant differences between pre- and post-test writing performance scores. Similarly, changes in motivation and engagement scores are analysed to evaluate the impact of AR on students' attitudes toward writing.

Qualitative data from observations, interviews, and student reflections are analyzed using thematic analysis. Patterns and themes related to engagement, creativity, collaboration, and perceptions of AR learning are identified. This analysis provides a deeper understanding of how AR influences not only measurable writing outcomes but also students' experiences, confidence, and intrinsic motivation. Triangulation of quantitative and qualitative findings ensures that the study provides a holistic view of the AR-based instructional impact.

Ethical Considerations

Ethical standards are strictly observed throughout the research process. Informed consent is obtained from school administrators, teachers, parents, and students prior to participation. Students' privacy and anonymity are maintained, and all data collected are used solely for research purposes. The study also ensures that AR-based activities are aligned with Islamic educational values and cultural sensitivities, promoting a safe and respectful learning environment.

Limitations

While the study seeks to provide robust findings, several limitations are acknowledged. First, the sample is limited to two schools, which may affect the generalizability of results. Second, the duration of the AR intervention may limit the long-term assessment of writing skill retention. Third, varying levels of prior digital literacy among students may influence engagement and outcomes. Despite these limitations, the study offers valuable insights into the potential of AR as a tool to enhance motivation and writing skills in Islamic primary education.

Results and Discussion

This study investigates the impact of Augmented Reality (AR) on motivation and writing skills in Islamic primary education. Data were collected through pre- and post-tests of writing performance, motivation and engagement questionnaires, classroom observations, and interviews with students and teachers. The results are presented in two main sections: improvements in writing skills and enhancement of motivation and engagement.

1. Writing Skill Improvement

Quantitative analysis of writing performance tests indicates a significant improvement in students' writing skills following the AR-based intervention. Pre-test scores revealed an average writing proficiency of 62.5%, reflecting challenges in vocabulary usage, sentence structure, and narrative coherence. Post-test results showed an average score of 81.2%, representing an improvement of 18.7 percentage points. Statistical analysis using a paired sample t-test confirms that this increase is significant ($p < 0.01$), demonstrating that AR integration positively influenced students' writing performance.

Specifically, improvements were observed in several areas:

- Vocabulary and Expression: Students showed more diverse word choices and richer expressions in their narratives. The AR prompts provided visual and contextual cues that helped students select relevant vocabulary aligned with Islamic themes.
- Narrative Structure and Coherence: Exposure to interactive 3D story environments enabled students to better organize their ideas, maintain logical story flow, and develop coherent plotlines. Students often referred to AR visuals to sequence events and create descriptive passages.
- Creativity and Imagination: AR-based learning stimulated students' imagination, as they were encouraged to explore virtual scenarios and then express their experiences in writing. Creative use of Islamic historical events and Quranic stories in narratives increased significantly compared to pre-intervention outputs.

Teachers also noted that students were more willing to experiment with complex sentence structures and stylistic elements in their writing. One teacher stated, *"Students who usually write short, simple sentences began to develop richer stories inspired by the AR experiences."* This qualitative evidence aligns with quantitative improvements, suggesting that AR provides both cognitive and creative scaffolding for young writers.

2. Motivation and Engagement

Analysis of motivation and engagement questionnaires shows substantial increases in students' interest and enjoyment in writing activities. Pre-intervention scores averaged 3.1 on a 5-point Likert scale, while post-intervention scores increased to 4.2. Students reported that AR-based lessons made writing tasks feel more interactive, exciting, and meaningful.

Classroom observations reinforced these findings. During AR activities, students were highly focused, asked more questions, and collaborated with peers to discuss story elements. Instances of off-task behavior decreased compared to traditional writing lessons, indicating heightened intrinsic motivation. Moreover, students expressed greater confidence in their abilities to complete writing tasks. For example, one student commented, *"I liked the story I explored in AR. It helped me write more ideas without getting stuck."*

The thematic analysis of interviews and reflections revealed three key motivational factors:

1. Immersive Learning Experience: AR created a sense of presence and exploration, allowing students to "experience" stories rather than merely read them. This immersion increased curiosity and engagement.

2. Interactive Feedback: Immediate visual feedback and the ability to manipulate AR elements helped students feel more in control of their learning, reinforcing persistence and effort.
3. Cultural and Religious Relevance: Integrating Islamic narratives strengthened students' connection to the content, providing both educational and spiritual motivation. Writing became a meaningful exercise that reinforced faith-based learning.

3. Discussion

The findings of this study clearly indicate that Augmented Reality (AR) serves as an effective tool for enhancing both writing skills and motivation in Islamic primary education. The integration of AR into writing instruction provides not only cognitive scaffolding but also creates meaningful, value-driven learning experiences that support the holistic development of young learners. These results resonate with constructivist learning theories, which emphasize that knowledge is actively constructed by learners through interaction, exploration, and reflection. In this context, AR functions as a mediating tool that bridges abstract ideas and concrete experiences, enabling students to internalize knowledge in ways that traditional methods often cannot achieve.

Enhancement of Writing Skills through AR

One of the most notable outcomes of the study is the significant improvement in students' writing skills. Writing in primary education is a complex process that encompasses multiple sub-skills, including vocabulary acquisition, sentence construction, narrative organization, creativity, and coherence. The study demonstrates that AR provides students with an environment that supports the development of these sub-skills in a synergistic manner. By presenting students with immersive story environments and interactive prompts, AR reduces cognitive load, allowing learners to allocate their mental resources to higher-order writing processes, such as idea generation and narrative structuring (Radianti, 2020).

The scaffolding effects of AR are particularly significant in the context of Islamic primary education, where writing tasks often involve understanding and reflecting upon faith-based content. Traditional teaching methods, which may rely heavily on rote memorization or teacher-led instruction, can leave students struggling to connect content with personal experiences or creative expression. AR mitigates these challenges by providing visual, auditory, and interactive cues that guide learners through the writing process. For example, a student exploring a virtual depiction of a Quranic story can observe characters, settings, and events in a three-dimensional space, making abstract narrative elements tangible. This multisensory engagement enhances comprehension and enables students to construct richer, more coherent written narratives, .

Furthermore, AR stimulates creativity by presenting open-ended scenarios that invite students to experiment with ideas and narrative structures. Unlike conventional worksheets or static texts, AR experiences are dynamic and often allow for multiple interpretations. This flexibility encourages students to explore different plotlines, character motivations, and outcomes, which strengthens not only their technical writing skills but also their imaginative capacities. The study's results align with previous research demonstrating that digital tools can enhance literacy by providing engaging, context-rich environments that support

experimentation and iterative learning. By combining scaffolding and creative exploration, AR establishes a robust framework for writing development in primary education.

Motivation and Engagement

Motivation is a critical factor in educational outcomes, particularly in writing, where sustained effort and practice are essential. The study findings reveal that AR significantly enhances intrinsic motivation by transforming writing from a task-oriented activity into an engaging, exploratory process. Traditional writing exercises can be perceived as repetitive or abstract, leading to low interest and reduced engagement. AR counteracts this perception by introducing interactive narratives that capture students' attention, stimulate curiosity, and provide immediate, meaningful feedback. The immersive quality of AR fosters a sense of presence and agency, encouraging learners to take ownership of their work and persist in writing activities.

The integration of Islamic content into AR-based lessons further amplifies motivational effects. Students are not only practicing literacy skills but also engaging with narratives that are culturally and spiritually meaningful. This dual focus—simultaneously developing writing proficiency and reinforcing Islamic values—provides learners with a clear sense of purpose. Writing becomes more than an academic exercise; it is an opportunity to reflect on moral lessons, internalize ethical principles, and engage thoughtfully with faith-based knowledge. Observations from classroom interactions and student reflections indicate that this value-based learning approach fosters deeper engagement and sustained interest.

The study also highlights the role of AR in supporting different learning styles. Students vary in their preferences and strengths—some may excel in visual learning, others in auditory or kinaesthetic modes. AR accommodates these differences by providing multimodal stimuli, ensuring that diverse learners can engage with content effectively. Classroom observations showed that previously disengaged students, including those with low writing confidence, actively participated when AR elements were introduced. This suggests that AR can reduce disparities in learning opportunities, promote inclusivity, and support differentiated instruction. Teachers reported that students who typically struggled with sequencing events or maintaining coherence in narratives were able to produce more structured and creative work when interacting with AR prompts, (Guo, 2020).

Cognitive and Affective Dimensions of Learning

The findings of this study suggest that AR positively affects both cognitive and affective dimensions of learning. Cognitively, AR facilitates knowledge construction, idea generation, and organization of written content. Students are able to visualize abstract concepts, explore interactive scenarios, and integrate textual, visual, and spatial information into their writing. The resulting improvement in narrative coherence, vocabulary richness, and creative expression underscores the potential of AR to enhance complex cognitive skills in young learners.

Affectively, AR contributes to positive attitudes toward writing by increasing engagement, confidence, and enjoyment. Motivation and engagement are closely linked to self-efficacy, the belief in one's ability to succeed in a task. Students who experienced AR-based lessons reported increased confidence in their writing abilities and were more willing to experiment

with new ideas. This aligns with Bandura's social cognitive theory, which emphasizes the importance of self-efficacy and motivation in learning outcomes. The study demonstrates that AR not only equips students with skills but also fosters a positive emotional relationship with writing, which is critical for sustained learning and growth.

Integration of Islamic Educational Values

A distinguishing feature of this study is the integration of Islamic content into AR-based writing instruction. In Islamic primary education, literacy development is intertwined with moral, spiritual, and cultural objectives. Writing activities that incorporate stories from the Quran, the lives of the prophets, and ethical parables provide students with opportunities to reflect on values while practicing language skills. AR enhances this process by presenting content in an immersive and interactive manner, making religious and ethical narratives more accessible and engaging, (Hwang, 2023).

Students reported that interacting with virtual Islamic stories helped them better understand the events, characters, and moral lessons, which they could then articulate in their writing. This approach supports holistic education by simultaneously nurturing cognitive, creative, and spiritual dimensions. Moreover, the use of culturally and religiously relevant content ensures that technology integration respects and reinforces local educational values, addressing concerns that digital tools may otherwise be culturally neutral or misaligned with faith-based learning goals, (Castro, 2021).

Pedagogical Implications

The results of this study have several pedagogical implications for Islamic primary education. First, AR can be employed as a tool for differentiated instruction, allowing teachers to cater to the diverse abilities and learning styles of students. By providing multimodal prompts, interactive scaffolds, and flexible scenarios, AR enables learners to progress at their own pace and according to their individual interests. Second, AR facilitates constructivist pedagogy, encouraging students to actively construct knowledge rather than passively receive information. Teachers act as facilitators and guides, supporting students in exploring, reflecting, and articulating their ideas. Third, AR can be strategically aligned with Islamic educational goals, ensuring that technological innovation complements, rather than replaces, value-based learning, (Chan, 2023).

Furthermore, the study highlights the importance of teacher preparation and professional development. While AR offers significant potential, effective implementation requires teachers to be proficient in both technological tools and pedagogical strategies. Training should focus on lesson design, integration of Islamic content, and management of interactive classroom activities. Teachers' ability to guide exploration, provide feedback, and scaffold writing tasks is critical to achieving meaningful learning outcomes.

Challenges and Limitations

Despite the positive outcomes, several challenges emerged during the study. Limited access to AR-compatible devices was a notable constraint, particularly in schools with constrained resources. Technical difficulties, such as software glitches or device malfunctions, occasionally disrupted lessons and required contingency planning. Additionally, some

students initially struggled with navigating AR interfaces, highlighting the need for orientation and support during the early stages of implementation.

Another limitation concerns the duration of the intervention. The study was conducted over six weeks, which is sufficient to observe short-term improvements in writing skills and motivation, but may not capture long-term retention or sustained behavioral changes. Future research should consider longitudinal studies to evaluate the enduring effects of AR on literacy and value-based learning (Ouyang, 2022).

Finally, while the study focused on writing and motivation, other aspects of learning—such as critical thinking, collaborative problem-solving, and digital literacy—may also be influenced by AR experiences. Further research could explore these dimensions to provide a more comprehensive understanding of the pedagogical potential of AR in Islamic primary education.

Implications for Policy and Practice

The findings suggest that educational policymakers and school administrators should consider integrating AR into curriculum design and teaching strategies. AR offers a scalable and flexible approach to modernizing writing instruction while maintaining alignment with Islamic educational principles. Investments in AR infrastructure, teacher training, and content development can facilitate the effective adoption of this technology. Additionally, collaboration between educators, technologists, and curriculum developers can ensure that AR applications are pedagogically sound, culturally relevant, and sustainable (Zhai, 2021).

The study also underscores the need for policies that support digital equity. Ensuring that all students have access to AR-enabled devices and reliable digital resources is essential for maximizing the benefits of technology-enhanced learning. Schools may consider blended learning models that combine traditional instruction with AR activities, making efficient use of available resources while gradually scaling up technology integration.

Conclusion

In conclusion, this study demonstrates that AR is a powerful tool for enhancing both writing skills and motivation in Islamic primary education. By providing immersive, interactive, and culturally meaningful learning experiences, AR supports cognitive, creative, and spiritual development. The scaffolding effects of AR, coupled with its ability to stimulate intrinsic motivation and accommodate diverse learning needs, make it a valuable addition to modern pedagogical practice.

The integration of Islamic content ensures that technology serves not only as a skill-development tool but also as a medium for value-based learning. Teachers play a crucial role in mediating AR experiences, guiding exploration, and scaffolding writing tasks to ensure meaningful learning outcomes. While challenges such as device availability and technical proficiency exist, these can be mitigated through professional development, infrastructure planning, and incremental implementation strategies.

Overall, the study contributes to the growing body of research on educational technology and provides practical insights for educators, curriculum developers, and policymakers. AR has

the potential to transform conventional writing instruction, fostering a generation of learners who are not only literate and creative but also spiritually aware and motivated to engage with meaningful content. Future research should explore long-term impacts, additional learning domains, and broader classroom contexts to further validate and expand upon these findings.

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