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Enhancing Islamic Moral Understanding and Critical Thinking through an Augmented Reality Qur'anic Storytelling Platform in Primary Education

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ABSTRACT

Islamic Religious Education (IRE) aims not only to impart religious knowledge but also to cultivate students' moral understanding and critical thinking. However, conventional Qur'anic storytelling methods often fall short in engaging students cognitively and ethically. This study investigates the effectiveness of an Augmented Reality (AR)–based Qur'anic storytelling platform in enhancing Islamic moral understanding and critical thinking among primary school students. A quasi-experimental pretest–posttest non-equivalent control group design was used with 80 sixth-grade students in Indonesia, divided equally into experimental and control groups. The experimental group received instruction through the AR-based Qur'anic storytelling platform, while the control group experienced conventional teacher-led narrative instruction. A 30-item validated instrument assessed Islamic moral understanding and critical thinking before and after the intervention. Posttest scores showed significantly higher gains in the experimental group for both Islamic moral understanding ($M = 82.90$) and critical thinking ($M = 80.25$), compared to the control group ($M = 68.75$ and $M = 65.90$, respectively). Independent t-tests confirmed these differences were statistically significant ($p < .001$). Large effect sizes (Cohen's $d > 1.90$) were observed, indicating strong practical impact. Findings suggest that AR-enhanced storytelling can transform traditional moral instruction by fostering deeper engagement, reflective judgment, and higher-order thinking. This pedagogically guided use of AR offers promising implications for values-based education and supports the integration of immersive technologies into Islamic Religious Education curricula.

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1. INTRODUCTION

Education in the twenty-first century has undergone a significant transformation as digital technologies increasingly shape how learners access information, construct knowledge, and develop essential cognitive competencies (Arifin & Muslimin, 2021). Among these technologies, Augmented Reality (AR) has garnered growing attention in general education due to its ability to seamlessly integrate digital content with real-world environments through interactive three-dimensional visualizations (Alzahrani, 2020). Previous studies have demonstrated that AR can enhance students' engagement, motivation, and conceptual understanding by supporting experiential and inquiry-based learning, particularly in primary education contexts where learners benefit from concrete and visually rich representations of abstract ideas (Basri & Setiawan, 2020). As a result, AR has been widely explored in subjects such as science, literacy, and social studies, where it has demonstrated potential for enhancing higher-order thinking skills and fostering meaningful learning experiences (Azmi & Abdul Rahman, 2021).

Beyond cognitive outcomes, education—especially at the primary level—also plays a crucial role in fostering moral development and ethical reasoning (Arsyad et al., 2022). In Islamic Religious Education (IRE), moral formation is a central objective, as learners are expected not only to acquire religious knowledge but also to internalize Islamic values and apply them in daily life. Qur'anic narratives have long served as a foundational pedagogical medium in Islamic education, offering moral exemplars and ethical lessons through stories of prophets and historical communities. Storytelling based on the Qur'an enables students to engage emotionally and cognitively with moral concepts such as honesty, patience, justice, and responsibility (Al-Sharafi et al., 2021). However, conventional approaches to Qur'anic storytelling in many classrooms remain predominantly teacher-centered and text-based, which may limit students' opportunities for active reflection, interpretation, and moral reasoning.

Despite the recognized importance of moral education in IRE, several challenges persist in current instructional practices. Traditional storytelling methods often emphasize passive listening and factual recall over analytical engagement with the moral dilemmas embedded in Qur'anic narratives. Moreover, the learning preferences of contemporary students—who are increasingly exposed to digital and interactive media—are not always well aligned with conventional pedagogical approaches. Previous studies indicate that while storytelling remains effective for transmitting values, its impact on students' critical thinking and moral reasoning is constrained when it lacks interactivity and contextual visualization (Fitriani & Hasanah, 2020; Hardiansyah & Mulyadi, 2022). These limitations suggest a need for pedagogical innovation that preserves the moral depth of Qur'anic narratives while enhancing students' engagement and higher-order cognitive processing.

Augmented Reality offers promising opportunities to address these challenges within Islamic Religious Education. By enabling learners to visualize narrative events, characters, and settings in immersive formats, AR has the potential to transform Qur'anic storytelling from a passive activity into an interactive learning experience. AR-based storytelling can incorporate reflective prompts, scenario exploration, and guided discussions that encourage students to analyze characters' decisions, evaluate consequences, and articulate moral judgments (Fauzi & Yulianti, 2021). Such features align with constructivist and experiential learning principles, which emphasize active knowledge construction through interaction and reflection (Chen & Tsai, 2022). When applied thoughtfully, AR may support not only comprehension of religious content but also the development of moral reasoning and critical thinking skills within an Islamic educational framework.

Despite this potential, few empirical studies have systematically examined the use of Augmented Reality to support moral understanding and critical thinking in Islamic Religious Education, particularly at the primary school level. Existing AR research in Islamic education has largely focused on basic conceptual learning or ritual practices, such as prayer procedures or recognition of religious symbols, with limited attention to higher-order cognitive and ethical outcomes (Chou & Feng, 2019). Moreover, research on AR in general education rarely addresses values-based or religious learning

contexts, leaving a gap in understanding how immersive technologies may contribute to moral and reflective learning. This gap highlights the need for empirical investigation into how AR-enhanced Qur'anic storytelling can support both moral cognition and critical thinking among young learners.

The present study focuses on sixth-grade students, as this developmental stage is particularly suitable for examining moral understanding and critical thinking. According to cognitive development theory, learners at this age are transitioning into the formal operational stage, where they begin to demonstrate more advanced reasoning, perspective-taking, and the ability to analyze abstract concepts such as moral principles and ethical consequences (Nevrelová et al., 2024). At the same time, late primary students are developmentally ready to engage with structured moral dilemmas and reflective discussions, making them an appropriate population for exploring the pedagogical potential of AR-based moral instruction.

Accordingly, this study explores the potential of an augmented reality–based Qur'anic storytelling platform as a pedagogical innovation for Islamic Religious Education in primary schools. By employing a quasi-experimental design, the study seeks to examine whether AR-enhanced storytelling can more effectively support students' Islamic moral understanding and critical thinking compared to conventional instructional approaches. Through this investigation, the study aims to contribute empirical evidence to the growing body of research on educational technology in values-based education and to offer pedagogical insights for educators, curriculum developers, and policymakers seeking to integrate digital innovation into Islamic education in a pedagogically meaningful and developmentally appropriate manner.

2. METHODS

This study employed a quasi-experimental pretest–posttest non-equivalent control group design to examine the effectiveness of an Augmented Reality (AR)–based Qur'anic storytelling platform in enhancing students' Islamic moral understanding and critical thinking skills. A quasi-experimental approach was selected because random assignment of individual students was not feasible within the school context. Instead, participants were allocated based on existing intact classes to avoid instructional disruption and to maintain natural classroom conditions. One intact class was designated as the experimental group, while another served as the control group. Both groups completed pretests before the intervention and posttests following the intervention to assess learning gains attributable to the instructional treatment.

The participants consisted of 80 sixth-grade students enrolled in a public primary school in Indonesia. The sample was selected using cluster sampling based on existing class groupings. One class (n = 40) was assigned as the experimental group, and the other class (n = 40) served as the control group. Sixth-grade students were chosen due to their developmental readiness for higher-order reasoning, including the ability to analyze moral dilemmas and engage in reflective thinking. Before data collection, institutional permission was obtained from the school administration, and students were informed about the study's purpose. Participation was conducted within regular instructional time, and both groups received content aligned with the national Islamic Religious Education curriculum.

The experimental group received instruction using an Augmented Reality Qur'anic Storytelling Platform, while the control group was taught using conventional narrative-based instruction, consisting of teacher-led storytelling, textbook reading, and guided discussion. The AR-based platform presented selected Qur'anic stories that emphasize moral values relevant to primary learners, including narratives related to honesty, patience, responsibility, and obedience to divine guidance. Examples of stories included prophetic narratives and moral episodes adapted from the Qur'an and presented in age-appropriate language and visual form. Through AR-enabled mobile devices, students were able to view three-dimensional animated scenes overlaid onto physical learning materials, allowing the story events and characters to appear within their real-world classroom environment.

The AR storytelling platform incorporated several interactive features designed to support moral reasoning and critical thinking. These features included (a) interactive scene exploration, where students could observe story events from multiple perspectives; (b) decision-point prompts, which asked students to consider alternative actions that characters might take; and (c) reflective questions embedded at key narrative moments to encourage discussion of moral consequences and ethical choices. While the narrative structure followed a guided storyline, students were prompted to justify their responses during teacher-facilitated discussions rather than freely altering story outcomes. The intervention was implemented over four weeks, consisting of eight instructional sessions (two sessions per week). Each session lasted approximately 40 minutes, aligning with the school's regular lesson duration. The same teacher taught both groups to minimize instructor-related variability.

Data were collected using a structured achievement test consisting of 30 items, divided equally into two subscales: Islamic Moral Understanding Test (15 items), measuring students' ability to identify moral values in Qur'anic stories, explain moral lessons, relate values to daily behavior, and recognize the consequences of moral actions. Critical Thinking Skills Test (15 items), assessing analysis, evaluation, comparison of alternative actions, justification of moral decisions, and conclusion drawing based on narrative evidence. The test included a combination of multiple-choice items, short-answer questions, and scenario-based moral reasoning items derived from Qur'anic storytelling contexts. Sample items are provided in Appendix A. Content validity was established through expert review involving Islamic education specialists, educational technology experts, and experienced primary school teachers. Reliability analysis was conducted using Cronbach's alpha coefficients. The Islamic Moral Understanding subscale demonstrated acceptable internal consistency (α = 0.86), while the Critical Thinking subscale also showed strong reliability (α = 0.88), indicating that the instruments were suitable for assessing the targeted constructs.

Table 1. Structure of the Research Instrument

Construct	Indicators	Number of Items
Islamic Moral Understanding	Identifying moral values in Qur'anic stories; explaining moral lessons; connecting values to daily-life behavior; recognizing consequences of actions.	15 items
Critical Thinking Skills	Analyzing situations; evaluating actions of story characters; comparing alternative choices; providing justified moral reasoning; drawing conclusions based on evidence.	15 items
	Total Items	30 items

Data collection proceeded in three stages. First, both groups completed the pretest to establish baseline levels of Islamic moral understanding and critical thinking. Second, the instructional intervention was implemented according to the assigned treatment conditions. Throughout the intervention, the researcher conducted classroom observations and collected informal feedback from teachers to support the interpretation of quantitative results. Finally, the posttest was administered to both groups using the same instrument as the pretest.

Quantitative data were analyzed using statistical software. Descriptive statistics (means and standard deviations) were calculated for pretest and posttest scores. Assumption testing included the Shapiro–Wilk test for normality and Levene's test for homogeneity of variance. Independent-samples *t*-tests were used to compare posttest scores between the experimental and control groups, while paired-samples *t*-tests were conducted to examine pretest–posttest gains within each group. Effect sizes were calculated using Cohen's d to assess the magnitude of the intervention effects. No missing data were identified, as all participants completed both the pretest and posttest assessments. Therefore, no data imputation procedures were required. All statistical tests were conducted using a significance level of $p < .05$.

3. FINDINGS AND DISCUSSION

This section presents the findings of the quasi-experimental study investigating the effects of the Augmented Reality (AR) Qur'anic Storytelling Platform on sixth-grade students' Islamic moral understanding and critical thinking skills. The results are organized into descriptive statistics, assumption testing, and inferential analyses conducted to determine whether significant differences existed between the experimental and control groups following the instructional intervention. Both groups completed pretests and posttests measuring the two constructs (15 items each; total 30 items).

Table 2. Pretest Scores for Islamic Moral Understanding and Critical Thinking

Variable	Group	N	Mean	SD
Islamic Moral Understanding (Pretest)	Experimental	40	54.30	8.12
	Control	40	53.75	7.98
Critical Thinking (Pretest)	Experimental	40	52.10	7.45
	Control	40	51.80	7.66

Before the instructional intervention, pretest data were analyzed to examine baseline equivalence between the experimental and control groups. The results indicated that both groups demonstrated comparable initial levels of Islamic moral understanding and critical thinking. Mean differences between groups were minimal, suggesting that students entered the study with similar prior knowledge and reasoning abilities. This baseline comparability strengthens the internal validity of the quasi-experimental design and supports the interpretation that subsequent differences in posttest performance are likely attributable to the instructional intervention rather than pre-existing disparities.

Table 3. Posttest Scores for Islamic Moral Understanding and Critical Thinking

Variable	Group	N	Mean	SD
Islamic Moral Understanding (Posttest)	Experimental	40	82.90	6.55
	Control	40	68.75	7.10
Critical Thinking (Posttest)	Experimental	40	80.25	6.92
	Control	40	65.90	7.88

Posttest analyses revealed that students in the experimental group who participated in the Augmented Reality (AR)–based Qur'anic storytelling intervention achieved substantially higher scores in both Islamic moral understanding and critical thinking compared to students in the control group who received conventional instruction. The magnitude of the mean differences suggests strong evidence that AR-supported storytelling was associated with enhanced learning outcomes across both constructs. Rather than merely improving factual recall of moral content, the AR intervention appeared to support deeper engagement with Qur'anic narratives, enabling students to analyze character actions, evaluate moral consequences, and articulate reasoned judgments.

Table 4. Normality Test Results (Shapiro–Wilk)

Variable	Group	Statistic	p-value	Interpretation
Islamic Moral Understanding Posttest	Experimental	0.968	0.285	Normal
	Control	0.972	0.340	Normal
Critical Thinking Posttest	Experimental	0.959	0.190	Normal
	Control	0.964	0.225	Normal

All p-values exceeded 0.05, indicating no violation of normality. The distributions for both constructs in both groups were normal, supporting the use of parametric inferential tests (t-tests).

Table 5. Homogeneity of Variance Test (Levene's Test)

Variable	F	p-value	Interpretation
Islamic Moral Understanding Posttest	1.402	0.240	Variances are equal
Critical Thinking Posttest	0.998	0.320	Variances are equal

Because both p-values exceed 0.05, the assumption of homogeneity of variance is satisfied, allowing the use of pooled variance t-tests.

Table 6. Independent Samples t-Test for Posttest Scores

Variable	Group Means (Exp–Ctrl)	t	p-value	Interpretation
Islamic Moral Understanding	82.90 – 68.75	9.14	<0.001	Significant
Critical Thinking	80.25 – 65.90	8.52	<0.001	Significant

The independent-samples t-test results in Table 6 reveal a clear, statistically robust distinction between students exposed to the AR Qur'anic Storytelling Platform and those who received conventional instruction. The very high t-values ($t = 9.14$ for Islamic moral understanding and $t = 8.52$ for critical thinking) and the extremely small p-values ($p < 0.001$) indicate that the differences in posttest means are not only statistically significant but also highly reliable. These results suggest that the AR intervention exerted a substantial positive influence on students' learning outcomes. The experimental group demonstrated markedly higher average scores than the control group, with differences exceeding 14 points for both constructs. Such a large gap implies that the AR storytelling platform enhanced students' engagement, comprehension, and reflective thinking far beyond what traditional storytelling methods achieved. In addition, the magnitude of these differences suggests that AR's interactive and immersive features may have facilitated deeper cognitive processing and more meaningful moral interpretation. Taken together, the findings strongly confirm the superiority of AR-based Qur'anic storytelling in promoting both moral understanding and critical thinking among primary students.

Table 7. Paired Samples t-Test (Pretest–Posttest Within Groups)

Variable	Group	Pretest Mean	Posttest Mean	t	p-value	Interpretation
Islamic Moral Understanding	Experimental	54.30	82.90	22.12	<0.001	Significant gain
	Control	53.75	68.75	12.50	<0.001	Moderate gain
Critical Thinking	Experimental	52.10	80.25	19.84	<0.001	Significant gain
	Control	51.80	65.90	10.60	<0.001	Moderate gain

The paired-samples t-test results in Table 7 demonstrate significant learning gains in both the experimental and control groups; however, the magnitude of improvement clearly favors the experimental group exposed to the AR Qur'anic Storytelling Platform. In the experimental group, the increase from pretest to posttest scores is exceptionally large for both Islamic moral understanding ($t = 22.12$, $p < 0.001$) and critical thinking ($t = 19.84$, $p < 0.001$). These substantial gains indicate that the AR-enhanced learning environment provided highly effective scaffolding, enabling students to internalize moral concepts more deeply and engage in more complex cognitive processing.

Although the control group also showed statistically significant improvements—consistent with the benefits of conventional storytelling in moral education—the magnitude of gains was considerably smaller. This suggests that while traditional instruction contributes to baseline moral and cognitive development, it does not achieve the same level of conceptual depth or reflective engagement as the AR platform. The immersive and interactive features of AR likely allowed students to visualize narrative contexts, explore character decisions, and engage actively with moral dilemmas, thereby amplifying both moral understanding and critical thinking.

Table 8. Effect Size (Cohen's d)

Variable	Cohen's d	Effect Size Classification
Islamic Moral Understanding	2.04	Very Large Effect
Critical Thinking	1.90	Very Large Effect

Effect size analysis indicated large practical impacts of the AR intervention on both outcome variables. While large effect sizes should be interpreted with caution in educational research, particularly in classroom-based interventions, the observed values suggest that the differences between instructional approaches were educationally meaningful. Rather than indicating extraordinary effects, these findings suggest strong evidence for the pedagogical value of AR-enhanced Qur'anic storytelling when implemented within a structured and guided instructional framework. From an applied perspective, these effect sizes indicate that AR-supported storytelling has the potential to produce learning gains that are not only statistically significant but also relevant for classroom practice, particularly in domains that involve moral reasoning and critical reflection.

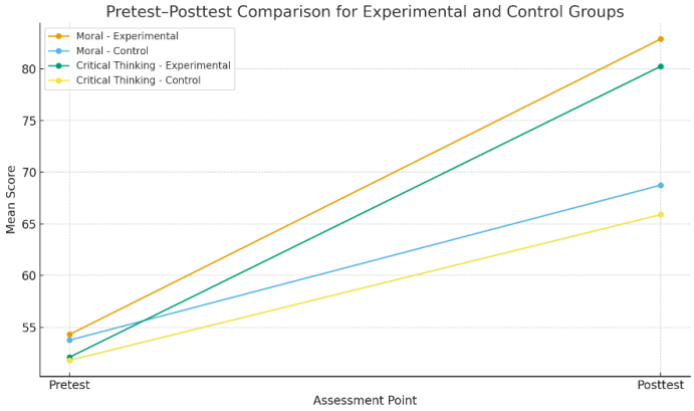

Figure 1. Pretest–Posttest Trends of Islamic Moral Understanding and Critical Thinking Scores for Experimental and Control Groups

The visual trends illustrated in Figure 1 further support the quantitative findings by depicting divergent learning trajectories between the experimental and control groups. The experimental group demonstrated a sharper increase from pretest to posttest across both Islamic moral understanding and critical thinking, whereas the control group exhibited more gradual improvement. This pattern suggests that the AR intervention accelerated students' learning progress rather than merely producing incremental gains. Importantly, the visual divergence between groups at the posttest stage highlights how immersive storytelling may intensify engagement and sustain students' attention throughout the instructional period. Rather than serving as a purely descriptive illustration, Figure 1 reinforces the interpretation that AR-based instruction altered the pace and depth of students' moral and cognitive development.

Discussion

The findings of this study can be interpreted through multiple theoretical lenses. From a constructivist perspective, AR-based storytelling enabled learners to actively construct moral understanding by engaging with narrative scenarios, reflecting on character decisions, and participating in guided discussions. This active engagement contrasts with more passive forms of instruction and supports the view that learning is most effective when learners interact meaningfully with content (Kerres & Schrader, 2022). Seeing behaviors displayed through animated, realistic agents allows learners to internalize values through observational learning. Similarly, the cognitive theory of multimedia learning suggests that individuals learn more effectively when information is presented through multiple modalities—visual, auditory, and interactive (Anshari et al., 2019). AR storytelling

operationalizes this principle by integrating narration, imagery, animation, and digital interactivity. This multimodal experience likely reduced cognitive load and enhanced comprehension, thereby supporting the substantial improvements in student outcomes (Rahman & Fitria, 2022).

Beyond general multimedia explanations, the observed gains in critical thinking may also be understood through Cognitive Load Theory (Sweller, 1998) and Dual Coding Theory (Paivio, 1986). AR storytelling integrates visual, verbal, and contextual information in ways that reduce extraneous cognitive load while strengthening germane processing. By presenting moral dilemmas through synchronized visual and narrative channels, AR may support dual coding of information, thereby enhancing comprehension and retention. This mechanism extends Mayer's Cognitive Theory of Multimedia Learning, which posits that learning is enhanced when learners can meaningfully integrate words and images through active processing (Smith & Johnson, 2023).

Furthermore, the interactive features of AR—such as decision-point prompts and reflective questions—may explain why critical thinking outcomes improved beyond what is typically reported in multimedia-based instruction. These features encourage learners to pause, evaluate alternatives, and justify reasoning, which are core components of critical thinking. In this sense, AR functions not only as a visualization tool but also as a scaffold for reflective judgment and ethical reasoning.

In the context of Islamic Religious Education, these findings extend existing literature that has primarily focused on AR for ritual learning or conceptual understanding. By demonstrating that AR can support moral cognition and critical thinking, this study contributes empirical evidence to a relatively underexplored area of educational technology research within values-based and religious education.

The results align with and extend findings from previous studies on AR in education. Prior research has shown that AR enhances engagement, motivation, and conceptual understanding across a variety of subjects (e.g., science, social studies, and literacy) (Ibáñez & Delgado-Kloos, 2019). For instance, studies report that AR improves critical thinking and problem-solving skills by providing interactive simulations and opportunities for students to manipulate digital objects within their learning space (Garzón et al., 2019). The current study supports these findings and expands their applicability to the domain of Islamic Religious Education.

In the context of moral education, storytelling has long been recognized as a powerful tool for communicating ethical values. However, traditional storytelling relies primarily on verbal or textual narration, requiring students to imagine narrative settings and situations. The integration of AR into storytelling transforms this dynamic by enabling students to visualize events and characters, thereby bridging the gap between abstraction and concrete experience (Santos et al., 2020). This echoes findings from researchers who emphasize the effectiveness of immersive storytelling technologies in enhancing empathy, moral reasoning, and narrative comprehension (López-Belmonte et al., 2021).

Moreover, studies involving AR in Islamic education remain relatively limited. Most existing research has focused on teaching rituals, foundational concepts, or memorization of Qur'anic verses. While these studies demonstrate improvements in motivation and basic knowledge acquisition, the present study advances the field by showing how AR can be leveraged to support higher-level cognitive and moral development. Unlike previous works that emphasize factual learning, this study illustrates AR's potential to support reflective thinking, ethical analysis, and interpretive reasoning—outcomes essential to holistic Islamic education (Buchori et al., 2020). According to Mahfuzah & Siregar, (2023), learning is most effective when individuals engage in a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation. AR storytelling embodies this cycle: students experience narrative events, reflect on character decisions, conceptualize moral lessons, and evaluate possible alternatives—all within the immersive story environment.

The results of this study have noteworthy implications for educators, curriculum designers, and policymakers in Islamic education. First, the dramatic increases in student learning outcomes suggest that AR storytelling can serve as a powerful enhancement to traditional teaching methods. Rather than replacing existing pedagogy, AR can complement it by bringing Qur'anic stories to life in ways that

appeal to digital-native learners. Teachers may find value in using AR to introduce or reinforce key moral concepts, enabling students to explore stories interactively before engaging in class discussions or reflective assignments. The visual and narrative richness of AR can help students grasp moral principles that might otherwise remain vague or disconnected from their lived experiences (Nizam & Aziz, 2020). Furthermore, the use of AR can encourage students to think critically about ethical dilemmas and analyze the reasoning behind moral choices, preparing them for real-world decision-making (Susanto & Samad, 2021).

At a broader level, this study highlights the urgent need for Islamic education to evolve in response to technological advancements. While traditional methods remain valuable, integrating innovative tools such as AR can significantly enrich learning and address challenges related to student engagement and comprehension. Given the strong effect sizes observed, policymakers might consider supporting the development of AR-based learning materials for Islamic education and providing teacher training on their effective use.

Despite the promising findings, several limitations should be acknowledged. First, although the same teacher taught both groups to ensure instructional consistency, a teacher effect cannot be entirely ruled out. Subtle differences in facilitation style or familiarity with AR technology may have influenced student engagement. Second, the study relied on researcher-developed instruments, which, although validated and reliable, may introduce measurement bias. Future studies could incorporate standardized or externally validated measures of moral reasoning and critical thinking. Third, the absence of a delayed posttest limits conclusions about the long-term retention of moral understanding and critical thinking gains. It remains unclear whether the observed improvements persist beyond the immediate instructional period. Longitudinal research is therefore needed to assess the durability of learning outcomes associated with AR-based storytelling. Additionally, the study was conducted in a single school context, which may limit generalizability. Replication across diverse educational settings and student populations would strengthen external validity and provide further insight into the scalability of AR interventions in Islamic education.

4. CONCLUSION

This study examined the use of an Augmented Reality (AR)–based Qur'anic storytelling platform as a pedagogical approach for enhancing Islamic moral understanding and critical thinking among sixth-grade students. The findings suggest strong evidence that students who engaged with AR-supported storytelling demonstrated greater learning gains in both moral comprehension and higher-order thinking compared to those who experienced conventional narrative-based instruction. These results indicate that immersive and interactive storytelling environments may support deeper engagement with Qur'anic narratives and facilitate reflective moral reasoning when implemented within structured instructional contexts. The effectiveness observed in this study stems not solely from the use of technology itself but from the pedagogically guided integration of visualization, interaction, and reflective prompts embedded within the storytelling process. This finding underscores the importance of aligning technological tools with sound instructional design principles to support meaningful learning outcomes.

The results carry several practical implications for key stakeholders in Islamic education. Curriculum developers should consider integrating AR-supported storytelling into Islamic Religious Education units that focus on moral values and ethical reasoning, ensuring alignment with curricular goals and students' developmental levels. Teacher educators may incorporate training on the pedagogical use of AR to help teachers design and facilitate reflective, inquiry-oriented learning experiences rather than using AR as a purely demonstrative tool. At the policy level, educational policymakers could support pilot programs that explore the feasibility and effectiveness of AR-based instructional tools across diverse school contexts, including variations in resources, teacher readiness, and student backgrounds.

Despite the contributions of this study, several directions for future research are recommended. Longitudinal studies are needed to examine whether the observed gains in moral understanding and critical thinking are sustained over time. Mixed-methods research designs could provide richer insights into students' reasoning processes, emotional engagement, and perceptions of AR-enhanced learning. Additionally, comparative studies across different grade levels and educational settings would help clarify how developmental factors influence the effectiveness of AR-based Qur'anic storytelling and inform age-appropriate instructional design.

While the findings suggest that AR-supported Qur'anic storytelling holds considerable pedagogical potential, its broader adoption in Islamic Religious Education should be approached thoughtfully, with careful attention to instructional design, teacher preparation, and contextual factors. Continued empirical investigation and collaborative efforts among researchers, educators, and policymakers will be essential to fully understand and responsibly implement AR as part of values-based and moral education in primary schools.

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