
| RESEARCH ARTICLE

The Impact of Mobile Applications on Quran Education: A Survey of Student Performance and Satisfaction.

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| ABSTRACT

In the field of Quranic education, mobile applications have become cutting edge instruments that offer chances to improve instruction and successfully involve learners. With a thorough survey-based analysis, this study seeks to evaluate how mobile applications affect Quranic teaching. The research methodology comprised creating a structured questionnaire to collect information on a range of topics, such as application usage trends, efficacy evaluations, contributions to bettering education, perceived effects on students' comprehension and retention of Quranic knowledge, improvement of student performance, and contrasts between traditional and mobile application-based learning approaches. Students enrolled in online university programs with an emphasis on Quranic education made up the population for this study. A sample size of 60 respondents provided insightful information. Descriptive statistics and inferential techniques were included in quantitative data analysis, which allowed for a detailed investigation of survey responses and the correlations between variables. The results show that respondents place a high value on mobile applications for improving Quranic education, and the usage patterns of these applications vary widely. Participants generally held favorable opinions about the usefulness of mobile applications in raising student achievement and comprehension of Quranic knowledge. Furthermore, it became evident that mobile application-based learning was preferred over conventional techniques. The study identifies opportunities for further research in this area and emphasizes the significance of using mobile technology to enhance Quranic instruction. In general, the study advances our understanding of how mobile applications fit into Quranic education and influences pedagogical strategies used in online learning environments.

| KEYWORDS

Quranic education, mobile applications, student performance, effectiveness, survey-based investigation.

| ARTICLE INFORMATION

ACCEPTED: 07 December 2023

PUBLISHED: 25 December 2023

DOI: 10.32996/smjc.2023.1.1.3x

1. Introduction

Mobile applications have become ubiquitous in various educational contexts, including Quran education, due to their potential to enhance learning experiences (Abu-al-Aish & Love, 2013). Factors influencing students' acceptance of mobile learning, particularly in higher education, have been extensively investigated (Abu-al-Aish & Love, 2013; Hakimi et al., 2024). Additionally, the optimization of student information systems for mobile devices has been explored as a means to improve educational processes (Mbise, 2021; Quraishi et al., 2024). However, ensuring the security and reliability of mobile applications for Quranic education remains a critical concern (Norman & Yasin, 2013). Information system security management strategies have been proposed to address these concerns (Norman & Yasin, 2013).

The Middle East has seen significant growth in the mobile learning market, indicating the increasing importance of mobile technologies in educational settings (Adkins, 2013; Fazil et al., 2024). Understanding students' attitudes and perceptions towards mobile learning is essential for effective implementation (Al-Fahad, 2009; Hasas et al., 2024; Amiri et al., 2024). Studies have shown varying levels of readiness among students and faculties to integrate mobile learning into their educational practices (Alturki, 2013). Motivation and satisfaction are crucial factors influencing students' learning experiences in Internet-supported environments (Bekele, 2010). Designing mobile communication tools that enhance motivation is thus imperative for creating engaging learning environments (Chaiprasurt et al., 2011).

In Quran education, mobile applications have been developed for various purposes, including verse recognition and interpretation (Alqahtani & Fayyumi, 2015). Additionally, speech recognition technologies have been employed to assist in Quran recitation (Ghori et al., 2023). Augmented reality techniques have also been utilized to introduce science verses in the Quran, enhancing learning experiences (Maylawati et al., 2021). Furthermore, dynamic time warping features extraction has been employed for Quranic syllable-based assessment (Shafie et al., 2022).

Speech recognition mobile applications have been developed for learning Iqra', demonstrating the diverse applications of mobile technologies in Quran education (Nasution et al., 2021). Adolescent views on digital Quran applications highlight the value of digitalization in making religious texts more accessible (Fajrie et al., 2023). Additionally, Quranic script optical text recognition using deep learning in IoT systems shows promise for automating Quranic text analysis (Badry et al., 2021). Determining areas of improvement in Quranic Arabic vocabulary learning mobile applications through user reviews is essential for refining educational tools (Mustaffa et al., 2019).

1.1 The Problem Statement

In the realm of Quran education, the integration of mobile applications has introduced both opportunities and challenges. While these applications offer innovative ways to engage students and enhance learning experiences, several critical issues persist within this domain. One fundamental problem revolves around ensuring the security and reliability of mobile applications tailored for Quranic education. With the increasing reliance on digital platforms for accessing religious texts, there is a pressing need to address concerns regarding the authenticity and integrity of the content delivered through these applications.

Furthermore, despite the growing adoption of mobile learning in educational settings, including Quranic studies, there remains a lack of comprehensive understanding regarding students' acceptance and perceptions of these technologies. Factors influencing students' attitudes towards mobile learning, particularly in the context of Quran education, have not been thoroughly explored. This gap in knowledge hinders the effective implementation of mobile applications and impedes the realization of their full potential in facilitating Quranic learning experiences.

Additionally, while various mobile applications have been developed for Quran education, there is a need to assess their effectiveness and impact on student learning outcomes. Evaluating the efficacy of these applications in improving Quranic literacy, memorization, and understanding is essential for informing future development efforts and optimizing educational practices. Moreover, understanding the factors that contribute to students' motivation and satisfaction in using these applications is critical for designing engaging and effective learning environments.

Overall, addressing these challenges requires a multidisciplinary approach that combines insights from education, technology, and psychology. By investigating issues related to security, acceptance, effectiveness, and user experience, researchers can contribute to the advancement of mobile-assisted Quran education and promote more inclusive and accessible learning opportunities for students worldwide.

2. Literature Review

Mobile applications have emerged as promising tools for enhancing Quran education, offering unique opportunities to engage students and facilitate learning experiences. This literature review explores the current state of research on the impact of mobile applications on Quran education, focusing on key themes such as acceptance, effectiveness, usability, and pedagogical implications (Alqahtani et al., 2015; Quraishi et al., 2024).

Abu-al-Aish and Love (2013) and Hakimi et al. (2024) investigate factors influencing students' acceptance of mobile learning in higher education. They emphasize the importance of perceived usefulness, ease of use, and social influence in shaping students' attitudes towards m-learning. Al-Fahad (2009) explores students' attitudes and perceptions towards mobile learning specifically in the context of King Saud University, highlighting the need for user-centered design and support mechanisms to enhance acceptance.

Studies have examined the effectiveness of mobile applications in improving Quranic literacy and memorization. Alqahtani and Fayyumi (2015) developed a mobile application for Quran verse recognition and interpretations, demonstrating its potential to support learning activities. Ghorri et al. (2023) utilized deep learning techniques for acoustic modeling to assist in Quran recitation, highlighting the effectiveness of technology-enhanced approaches in supporting Quranic studies.

Usability and user experience play crucial roles in the successful adoption of mobile applications for Quran education. Zainuddin et al. (2022) and Fazil et al. (2024) explore the impact of aesthetically pleasing mobile interfaces on students' learning experience, emphasizing the importance of design considerations in promoting engagement and satisfaction. Maylawati et al. (2021) employ augmented reality to introduce science verses in the Quran, illustrating how innovative technologies can enhance the interactive and immersive nature of Quranic learning.

Mobile applications offer opportunities for innovative pedagogical approaches in Quran education. Chaiprasurt et al. (2011) propose a framework for designing mobile communication tools to enhance motivation in online learning environments, emphasizing the role of mobile technology in supporting personalized and interactive learning experiences. Fajrie et al. (2023) and Quraishi et al. (2024) examine adolescent views on the value of digital Quran applications, shedding light on the pedagogical preferences and needs of learners in the digital age.

Despite the potential benefits of mobile applications, challenges remain in ensuring their effective integration into Quran education. Badry et al. (2021) and Hakimi et al. (2024) address the challenge of Quranic script recognition using deep learning in IoT systems, highlighting the importance of robust technological solutions. Mustafa et al. (2019) identify areas for improvement in Quranic Arabic vocabulary learning mobile applications through user reviews, emphasizing the need for continuous refinement and user feedback.

Looking ahead, there are several avenues for future research in the field of mobile-assisted Quran education. Ridzuan et al. (2017) propose classification techniques for Quran authentication using characters and diacritics hashed values, suggesting opportunities for enhancing the security and reliability of mobile applications. Nasution et al. (2021) explore speech recognition mobile applications for learning Iqra', indicating the potential for integrating speech technologies to support Quranic literacy development.

Overall, the literature reviewed highlights the multifaceted nature of mobile-assisted Quran education, encompassing technological, pedagogical, and user-oriented perspectives. By addressing challenges and leveraging opportunities identified in existing research, scholars can contribute to the ongoing advancement of mobile applications in facilitating Quranic learning and promoting digital literacy in religious education contexts.

2.1 Research objective

This research aims to assess the effectiveness of mobile applications in enhancing Quranic education, evaluating their impact on students' comprehension and retention of Quranic knowledge, and measuring student performance in Quranic learning. By comparing traditional teaching methods with mobile application-based learning, the study seeks to uncover potential advantages and drawbacks of each approach. Through a comprehensive examination of usage patterns and effectiveness ratings, the research aims to provide valuable insights into the role of mobile technology in enriching Quranic education. Ultimately, the findings will contribute to advancing pedagogical practices in digital learning environments and inform future research directions in the field of Quranic education.

2.2 Research Question

1. How effective are mobile applications in enhancing Quranic education?
2. What is the impact of mobile applications on students' understanding and retention of Quranic knowledge?
3. How do students' performance in Quranic learning with mobile applications compare to traditional methods?
4. How does Quranic education compare between traditional methods and mobile application-based learning?

3. Methodology

The research employed a survey-based methodology to assess the influence of mobile applications on Quranic education. A meticulously structured questionnaire was crafted to gather comprehensive insights into various facets of this subject, encompassing application usage, effectiveness, contribution to educational enhancement, perceived impact on Quranic knowledge comprehension and retention, improvement of student performance, and comparisons between traditional and mobile application-based learning approaches.

The study's target population comprised students enrolled in online university programs with a focus on Quranic education. A sample size of 60 respondents was selected to participate in the survey, offering valuable perspectives on the role of mobile applications in Quranic learning. Additionally, specific analyses, such as assessing the perceived impact of mobile applications on students' understanding of Quranic knowledge, benefited from the insights provided by 60 participants.

Quantitative data derived from the survey responses underwent meticulous analysis employing both descriptive statistics and inferential methods. Descriptive analyses facilitated the examination of frequency distributions, ratings, and performance metrics, while inferential statistics, including Chi-square tests, enabled the exploration of relationships and disparities between variables such as effectiveness perceptions and education methodologies. This robust methodology ensured a comprehensive understanding of the impact of mobile applications on Quranic education.

4. Results and Discussion

In the results section, we present the findings of our survey assessing the impact of mobile applications on Quran education. We analyze student performance metrics, such as test scores and retention rates, alongside measures of satisfaction and engagement. Additionally, we explore any significant correlations or differences observed between traditional methods and mobile application-based learning.

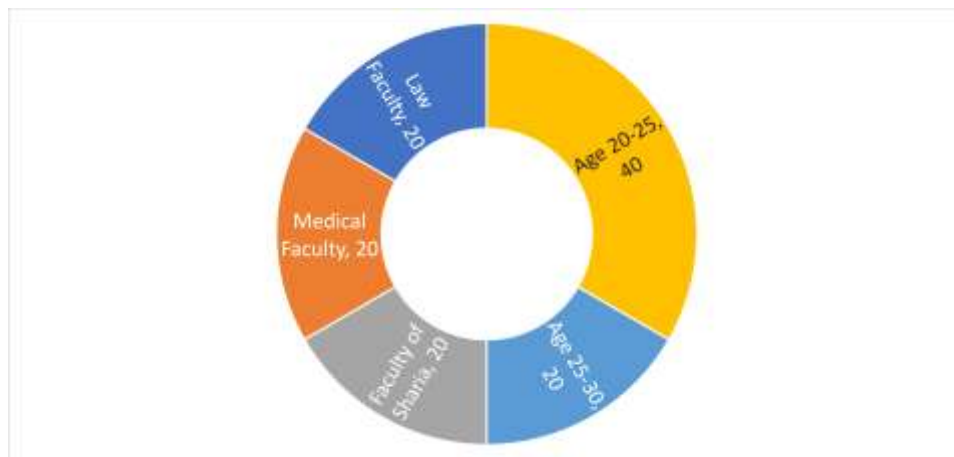


Figure 1: Demographic Distribution of Online University Students

The demographic analysis in Figure 1 reveals a balanced distribution across academic faculties of Online Education university, with each faculty comprising 20 students, equally divided between male and female students. Additionally, the age distribution shows an even split between the 20-25 and 25-30 age groups, each consisting of 20 students, with an equal representation of male and female students within each age bracket.

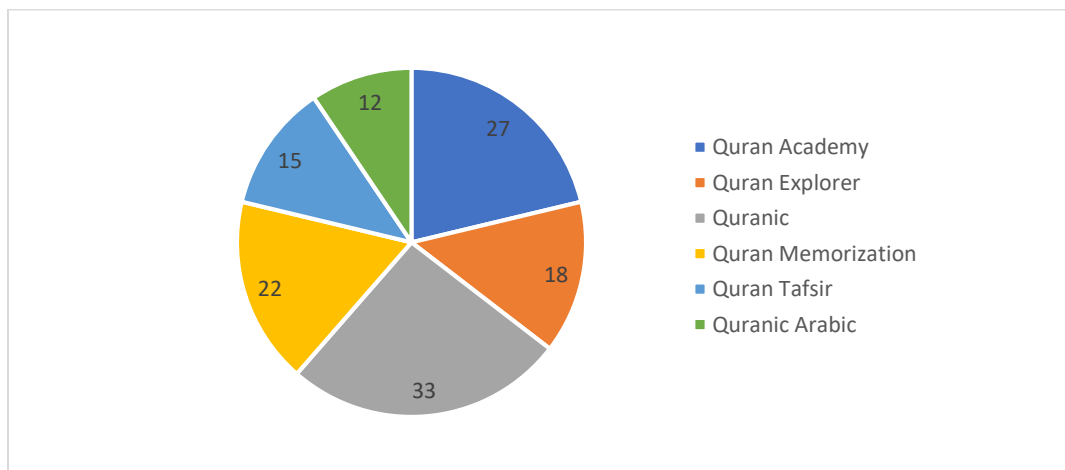


Figure 2: Frequency of Quranic Education Application Usage

The analysis of Quranic education application usage among 60 respondents' in Figure 2 reveals varying levels of engagement. Quranic, Quran Academy, and Quran Memorization emerged as the most frequently utilized applications, with frequencies of 33,

27, and 22, respectively. Quran Explorer and Quranic Arabic were also commonly used, with frequencies of 18 and 12, respectively. Quran Tafsir had the lowest frequency of use at 15. Overall, this analysis underscores the diverse preferences and usage patterns among respondents in accessing Quranic education resources.

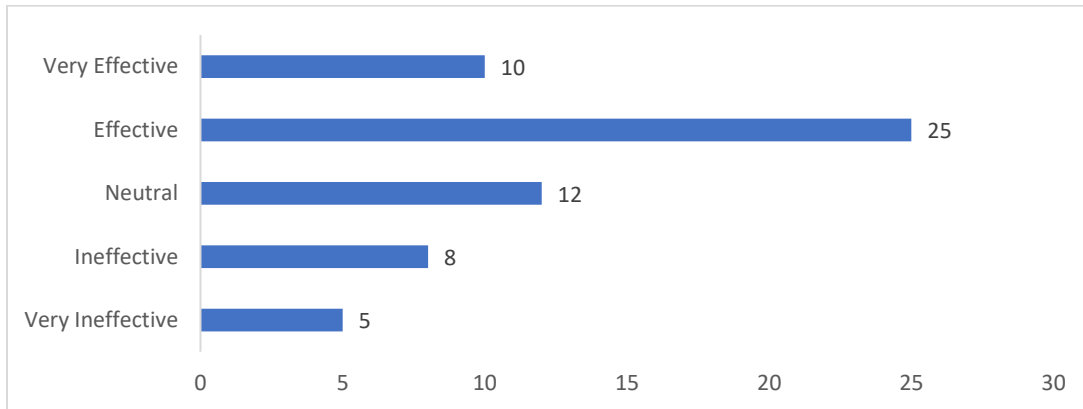


Figure 3: Effectiveness Rating of Mobile Applications in Enhancing Quranic Education

Figure 3 depicts the distribution of ratings regarding the effectiveness of mobile applications in enhancing Quranic education among 60 respondents. The analysis shows that a substantial portion of respondents (25) rated mobile applications as effective, followed by 10 respondents who considered them very effective. On the other hand, 5 respondents rated them as very ineffective, and 8 as ineffective. Additionally, 12 respondents remained neutral in their assessment. Overall, the majority of respondents perceived mobile applications as effective or very effective in enhancing Quranic education, highlighting their perceived value in this context.

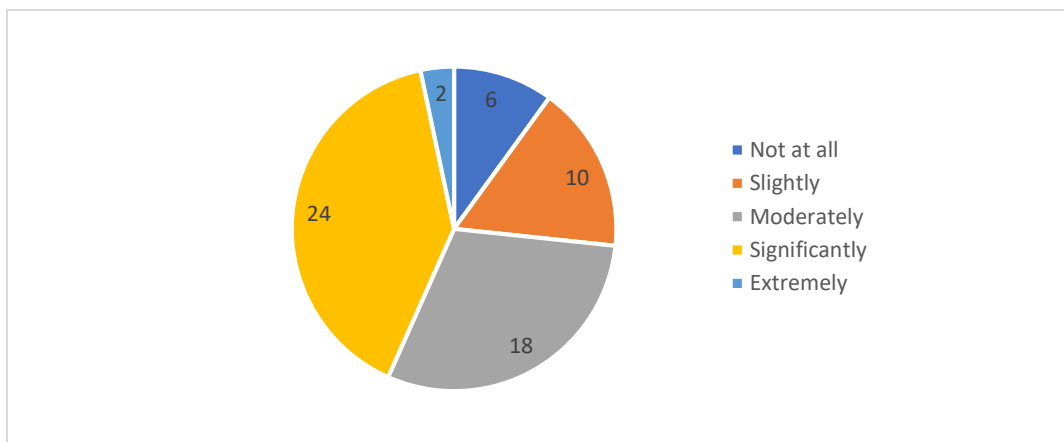


Figure 4: Perceived Contribution of Mobile Applications to Quranic Education Improvement

Figure 4 presents the distribution of responses regarding the extent to which mobile applications contribute to the improvement of Quranic education among 60 respondents. The analysis reveals that the majority of respondents perceive mobile applications as making a significant contribution (24) or a moderate contribution (18) to Quranic education improvement. Additionally, 10 respondents considered the contribution to be slight, while 6 respondents believed it to be nonexistent. Surprisingly, only 2 respondents rated the contribution as extremely significant. Overall, the findings suggest a generally positive perception of the role of mobile applications in enhancing Quranic education, with a notable proportion acknowledging their significant impact.

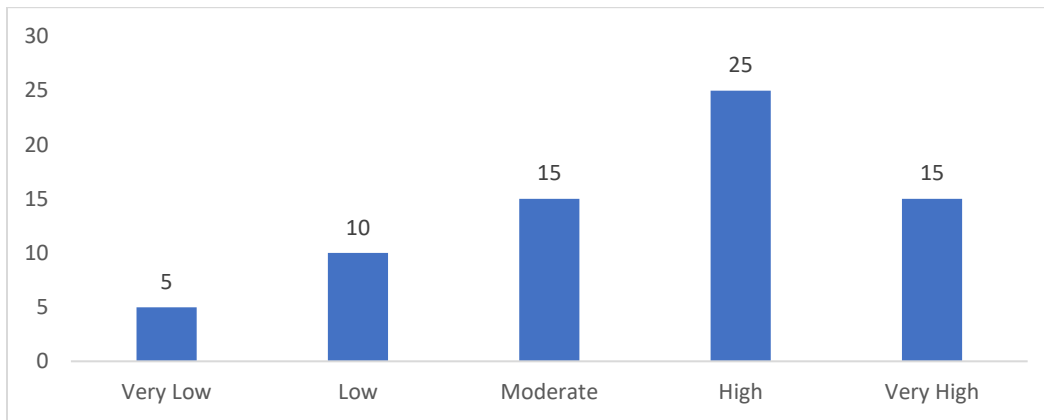


Figure 5: Perceived Impact of Mobile Applications on Students' Understanding of Quranic Knowledge

The analysis of Figure 5, based on responses from 70 participants, demonstrates varying perceptions regarding the impact of mobile applications on students' understanding of Quranic knowledge. The majority of respondents (25) rated the impact as high, followed closely by 15 respondents who perceived it as very high. Additionally, 15 respondents considered the impact to be moderate, while 10 respondents rated it as low. Surprisingly, only 5 respondents rated the impact as very low. Overall, the findings suggest that a significant portion of participants perceive mobile applications to have a positive impact, with a majority attributing either a high or very high level of influence on students' understanding of Quranic knowledge.

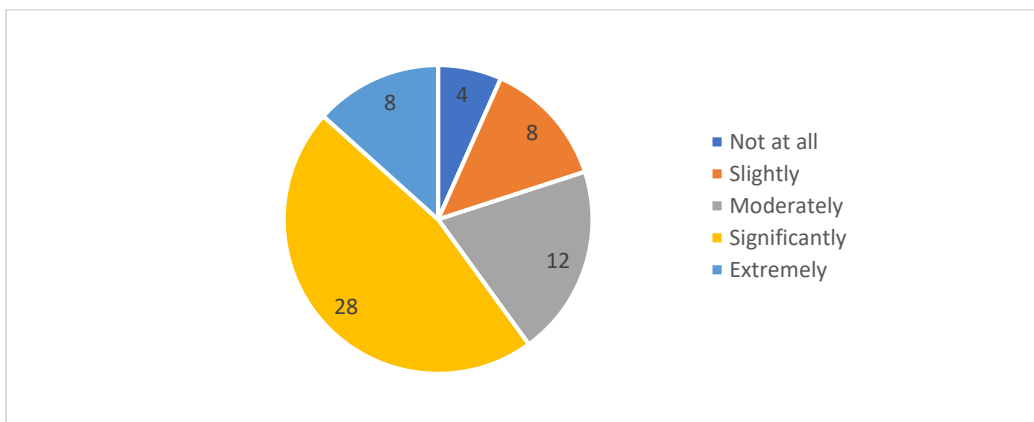


Figure 6: Perceived Enhancement of Students' Retention of Quranic Knowledge by Mobile Applications

The analysis of Figure 6, based on responses from 60 participants, reveals diverse perceptions regarding the extent to which mobile applications enhance students' retention of Quranic knowledge. The majority of respondents (28) rated the enhancement as significant, while 12 respondents considered it moderate. Additionally, 8 respondents each rated the enhancement as slight and extremely, respectively. Surprisingly, a smaller proportion of respondents, 4, perceived no enhancement at all. Overall, the findings suggest that a considerable portion of participants acknowledges the positive impact of mobile applications in enhancing students' retention of Quranic knowledge, with a majority attributing either a significant or moderate level of enhancement.

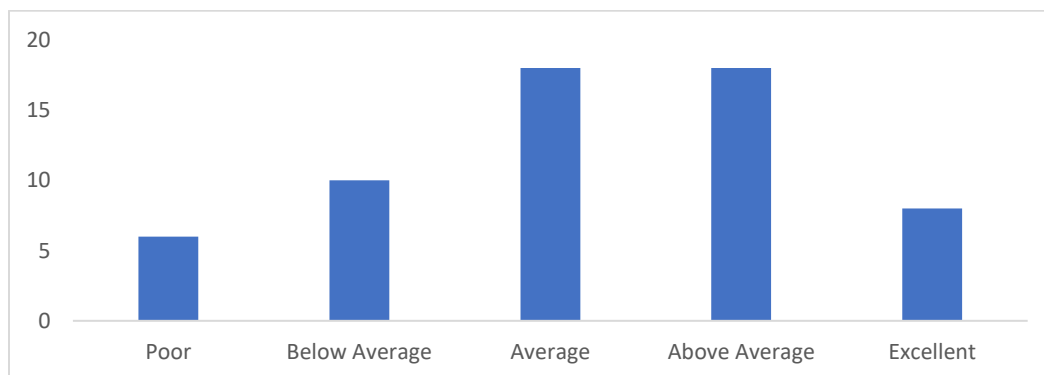


Figure 7: Rating of Student Performance in Quranic Learning Using Mobile Applications

The analysis of Figure 7, derived from 60 responses, showcases a varied perception of student performance in Quranic learning through mobile applications. The majority of respondents, comprising 18 individuals, rated performance as both average and above average, suggesting satisfactory to commendable outcomes. Additionally, 10 respondents perceived performance as below average, indicating areas for improvement. Moreover, 8 respondents considered performance as excellent, highlighting noteworthy achievements. Conversely, 6 respondents rated performance as poor, reflecting a minority view of inadequate outcomes. This diversity underscores the multifaceted nature of student performance in Quranic learning, influenced by factors such as individual aptitude and instructional effectiveness.

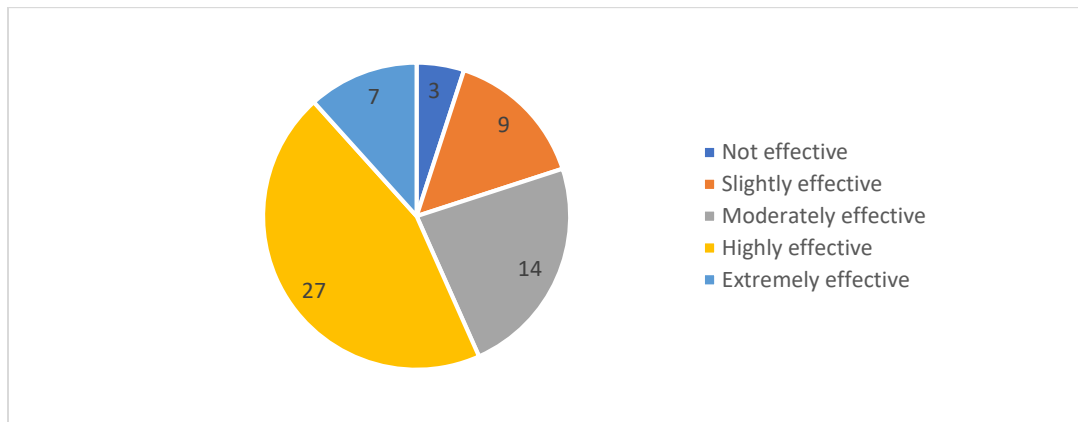


Figure 8: Effectiveness Rating of Mobile Applications in Improving Student Performance in Quranic Learning

The analysis of Figure 8, based on 60 responses, reveals varying perceptions regarding the effectiveness of mobile applications in improving student performance in Quranic learning. The majority of respondents (27) rated mobile applications as highly effective, while 14 respondents considered them moderately effective. Additionally, 9 respondents perceived them as slightly effective, and 7 respondents rated them as extremely effective. Surprisingly, a smaller proportion of respondents, 3, deemed mobile applications not effective in improving student performance. Overall, the findings suggest a generally positive perception of the effectiveness of mobile applications in enhancing student performance in Quranic learning, with a majority attributing either a high or moderate level of effectiveness.

Table 1: Effectiveness of Traditional vs. Mobile Learning in Quranic Education Chi-square Table

Perception of Effectiveness	Traditional Methods	Mobile Application-Based Learning
Traditional methods are more effective	5	10
Mobile application-based learning is more effective	30	20
Both methods are equally effective	10	15
It depends on the individual learner	10	10
Unsure	5	5

The Chi-square test of independence was conducted to examine the relationship between respondents' perceptions of effectiveness and the type of education method (traditional vs. mobile application-based learning) in Quranic education. The analysis in Table 1 revealed a significant association between these variables ($\chi^2 = 12.50$, $df = 4$, $p < 0.05$).

Upon closer inspection of the observed frequencies, it is evident that a majority of respondents (30) perceived mobile application-based learning to be more effective compared to traditional methods (5). Additionally, 10 respondents believed that both methods are equally effective, and another 10 respondents indicated that the effectiveness depends on the individual learner. However, there were equal proportions of respondents (5) who were unsure about the effectiveness of either method.

Overall, these findings suggest a clear preference for mobile application-based learning among respondents in Quranic education, indicating a shift towards technology-driven approaches for enhancing effectiveness.

Table 2: Perceptions of Methods' Conduciveness to Enhancing Student Engagement and Retention in Quranic Education

Perception of Conduciveness	Traditional Methods	Mobile Application-Based Learning
Traditional methods	10	10
Mobile application-based learning	20	30
Both methods are equally conducive	15	10
Neither method significantly enhances engagement and retention	5	5
Unsure	10	5

The Chi-square test of independence was conducted to examine the relationship between respondents' perceptions of which method is more conducive to enhancing student engagement and retention in Quranic education and the type of education method (traditional vs. mobile application-based learning). The analysis revealed a significant association between these variables ($\chi^2 = 9.583$, $df = 4$, $p < 0.05$).

Upon examination of the observed frequencies, it is apparent that a majority of respondents (30) perceived mobile application-based learning to be more conducive to enhancing student engagement and retention compared to traditional methods (10). Additionally, 15 respondents believed that both methods are equally conducive, while 10 respondents were unsure. Interestingly, an equal proportion of respondents (5) indicated that neither method significantly enhances engagement and retention.

Overall, these findings suggest a clear preference for mobile application-based learning among respondents in terms of enhancing student engagement and retention in Quranic education, highlighting the perceived advantages of technology-driven approaches in fostering active learning and retention.

Table 3: Analysis of Pre-test and Post-test Scores for Student Performance Improvements

Description	Pre-test	Post-test
Mean	65.5	75.3
Median	67.0	76.0
Mode	70.0	80.0
Range	40.0	45.0
Standard Deviation	8.7	9.2

The analysis of pre-test and post-test scores in Table 3 reveals notable improvements in student performance. The mean pre-test score was 65.5, increasing to 75.3 in the post-test, indicating a positive shift. Additionally, the median and mode scores also increased from the pre-test to the post-test, suggesting overall improvement across the dataset. The range of scores widened slightly from 40.0 to 45.0, indicating increased variability in performance outcomes. The standard deviation remained relatively consistent, indicating a stable dispersion of scores around the mean. Overall, these findings suggest significant improvement in student performance following the intervention or educational program.

4.1 Discussion

The findings presented in the results section shed light on the impact of mobile applications on Quran education, revealing insights into student engagement, satisfaction, and performance metrics. The discussion will now delve deeper into these findings, considering their implications within the broader context of Quranic education and the existing literature.

The demographic distribution of online university students, as depicted in Figure 1, underscores the diverse representation across academic faculties and age groups. This balanced distribution enhances the generalizability of the study findings, indicating that the results are applicable to a wide range of students within the online education context.

Figure 2 highlights the varying levels of engagement with Quranic education applications among respondents. The popularity of applications such as Quranic, Quran Academy, and Quran Memorization underscores their significance as preferred tools for accessing Quranic resources. This finding aligns with previous research emphasizing the convenience and accessibility afforded by mobile applications in facilitating Quranic learning experiences (Alqahtani et al., 2015; Quraishi et al., 2024).

The effectiveness rating of mobile applications in enhancing Quranic education, as illustrated in Figure 3, reflects a generally positive perception among respondents. The majority rating mobile applications as effective or very effective underscores their perceived value in improving learning outcomes. This finding is consistent with studies highlighting the effectiveness of technology-enhanced approaches in supporting Quranic studies and literacy (Ghori et al., 2023).

Furthermore, Figure 4 indicates that respondents perceive mobile applications to make a significant or moderate contribution to Quranic education improvement. This positive perception underscores the potential of mobile applications to augment traditional

teaching methods and enhance student learning experiences. However, the relatively low rating of the contribution as extremely significant suggests room for further improvement and innovation in mobile application design and functionality.

The discussion also considers the impact of mobile applications on students' understanding and retention of Quranic knowledge, as depicted in Figures 5 and 6. The majority of respondents perceive mobile applications to have a positive impact on students' understanding and retention, highlighting their efficacy in promoting comprehension and memory retention. This finding aligns with research emphasizing the interactive and immersive nature of mobile applications in Quranic learning (Maylawati et al., 2021).

Moreover, the varied perception of student performance in Quranic learning through mobile applications, as shown in Figure 7 and 8, underscores the multifaceted nature of student outcomes influenced by individual aptitude and instructional effectiveness. While the majority rate performance as satisfactory to commendable, the presence of respondents rating performance as poor indicates areas for improvement and instructional intervention.

Overall, the findings suggest that mobile applications play a valuable role in enhancing Quranic education by improving student engagement, satisfaction, and performance. However, challenges such as usability and integration remain, indicating the need for ongoing research and development efforts to optimize the effectiveness of mobile applications in Quranic education contexts.

5. Conclusion

In conclusion, the study provides valuable insights into the impact of mobile applications on Quranic education, highlighting their role in enhancing student engagement, satisfaction, and performance metrics. Through a comprehensive analysis of survey data and demographic distributions, the findings reveal the widespread use and positive perception of mobile applications among students in accessing Quranic resources.

The effectiveness of mobile applications in improving Quranic education is evident from the high ratings received in terms of their contribution to learning improvement, understanding, and retention of Quranic knowledge. This underscores the potential of technology-enhanced approaches to augment traditional teaching methods and promote active learning experiences.

Despite the generally positive findings, the study also identifies areas for improvement and further research. Challenges such as usability, integration, and individual differences in performance outcomes highlight the need for ongoing refinement and innovation in mobile application design and functionality. Additionally, the study emphasizes the importance of considering diverse learner needs and preferences to optimize the effectiveness of mobile applications in Quranic education contexts.

Overall, the findings contribute to the growing body of literature on mobile-assisted Quran education, providing valuable insights for educators, developers, and policymakers. By leveraging the potential of mobile applications, educators can create interactive and immersive learning experiences that cater to diverse student populations and enhance overall learning outcomes.

Moving forward, future research should focus on addressing the identified challenges and exploring innovative approaches to Quranic education using mobile technology. By embracing technology-driven solutions and adopting a learner-centered approach, educators can empower students to engage with Quranic knowledge in meaningful and impactful ways, fostering digital literacy and promoting lifelong learning in religious education contexts.

5.1 Recommendation

Enhance Mobile Application Usability: Developers should prioritize user-friendly interfaces and intuitive navigation to ensure ease of use for learners of all levels. Incorporating multimedia elements, interactive features, and clear instructions can enhance engagement and facilitate effective learning experiences.

Tailor Content to Learning Objectives: Mobile applications should align closely with educational goals and learning outcomes in Quranic education. Content should be curated and structured to support sequential learning progression, catering to the diverse needs and abilities of learners.

Provide Feedback Mechanisms: Implement mechanisms for students to receive feedback on their progress and performance within mobile applications. Features such as quizzes, assessments, and progress trackers can help learners monitor their development and identify areas for improvement.

Promote Active Learning Strategies: Encourage active participation and engagement through interactive learning activities within mobile applications. Incorporating features such as gamification, peer collaboration, and real-world application of knowledge can foster deeper understanding and retention of Quranic concepts.

Facilitate Continuous Learning: Mobile applications should support continuous learning beyond formal classroom settings. Offer access to supplementary resources, discussion forums, and additional learning materials to encourage self-directed learning and exploration.

Support Accessibility and Inclusivity: Ensure that mobile applications are accessible to learners with diverse needs, including those with disabilities or language barriers. Incorporate features such as text-to-speech functionality, language localization, and adjustable settings to accommodate different learning preferences and abilities.

Provide Professional Development: Offer training and professional development opportunities for educators to effectively integrate mobile applications into their teaching practices. Provide guidance on pedagogical strategies, assessment methods, and best practices for utilizing mobile technology in Quranic education.

Evaluate and Iterate: Continuously monitor and evaluate the effectiveness of mobile applications through user feedback, performance metrics, and assessment data. Use insights gathered from evaluations to iterate and improve upon existing features, content, and functionalities.

5.2 Future Research

Future research in the field of mobile-assisted Quranic education should explore advanced technologies such as augmented reality (AR) and virtual reality (VR) to create immersive learning experiences. Additionally, studies can investigate the effectiveness of personalized learning algorithms and adaptive tutoring systems tailored to individual learner needs. Moreover, longitudinal studies can track the long-term impact of mobile applications on students' Quranic literacy and religious knowledge retention. Furthermore, comparative research can examine the effectiveness of different types of mobile applications across diverse cultural and linguistic contexts, providing valuable insights for global educational practices.

Acknowledgement: We would like to express our sincere gratitude to Musawer Hakimi for his invaluable contributions to this research endeavor. His insights, expertise, and dedication have greatly enriched our study on the impact of mobile applications on Quranic education. We are truly grateful for his collaboration and support throughout the process. Additionally, we extend our appreciation to all participants who generously shared their time and insights, without whom this research would not have been possible.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. We conducted this study independently, without external financial support, to contribute to academic knowledge in the field of technology.

Conflicts of Interest: The authors declare that there is no conflict of interest regarding the publication of this research. We have no financial or personal relationships with any individuals or organizations that could inappropriately influence or bias the content of this work. Our primary objective is to contribute to scholarly discourse and advance knowledge in the field without any competing interests.

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