



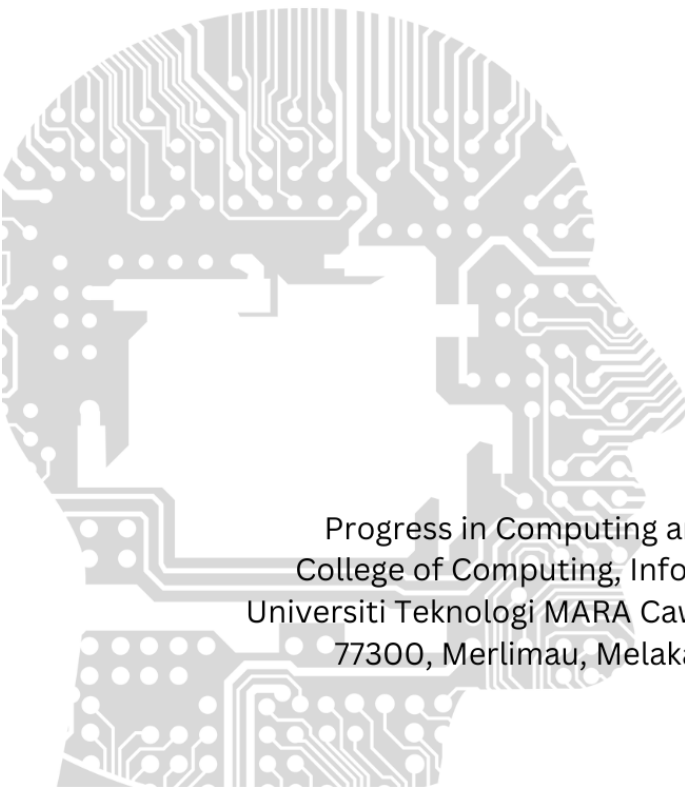
Cawangan Melaka

PCMJ

Progress in Computing and Mathematics Journal

volume 1

<https://fskmjebat.uitm.edu.my/pcmj/>



Progress in Computing and Mathematics Journal
College of Computing, Informatics, and Mathematics
Universiti Teknologi MARA Cawangan Melaka, Kampus Jasin
77300, Merlimau, Melaka Bandaraya Bersejarah

PCMJ

Progress in Computing and Mathematics Journal
volume 1



UNIVERSITI
TEKNOLOGI
MARA

Cawangan Melaka

Progress in Computing and Mathematics Journal (PCMJ)
College of Computing, Informatics, and Mathematics
Universiti Teknologi MARA Cawangan Melaka, Kampus Jasin
77300, Merlimau, Melaka Bandaraya Bersejarah

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission.

EDITORS

Ahmad Firdaus Ahmad Fadzil
Khyrina Airin Fariza Abu Samah
Raihana Md Saidi
Shahadan Saad
Sheik Badrul Hisham Jamil Azhar
Zainal Fikri Zamzuri
Siti Feirusz Ahmad Fesol
Salehah Hamzah
Raseeda Hamzah
Mohamad Asrol Arshad
Mohd Hafifi Mohd Supir
Nurul Hidayah Mat Zain
Syamsul Ariffin Yahaya
Edzreena Edza Odzaly

PCMJ

Progress in Computing and Mathematics Journal

volume 1

PREFACE

Welcome to the inaugural volume of the **Progress in Computing and Mathematics Journal (PCMJ)**, a publication proudly presented by the College of Computing, Informatics, and Mathematics at UiTM Cawangan Melaka.

This journal represents a significant step in our commitment to fostering a vibrant research culture, initially providing a crucial platform for our undergraduate students to showcase their intellectual curiosity, dedication to scholarly pursuit, and potential to contribute to the broader academic discourse in the fields of computing and mathematics. However, we envision PCMJ evolving into a beacon for researchers both nationally and internationally. We aspire to cultivate a space where groundbreaking research and innovative ideas converge, fostering collaboration and intellectual exchange among established scholars and emerging talents alike.

The manuscripts featured in this first volume, predominantly authored by our undergraduate students, are a testament to the hard work and dedication of these budding researchers, as well as the guidance and support provided by their faculty mentors. They cover a diverse range of topics, reflecting the breadth and depth of research interests within our college, and set the stage for the high-quality scholarship we aim to attract in future volumes.

As editors, we are honored to have played a role in bringing this journal to fruition. We extend our sincere gratitude to all the authors, reviewers, and members of the editorial board for their invaluable contributions. We also acknowledge the unwavering support of the college administration in making this initiative possible.

We hope that PCMJ will inspire future generations of students and researchers to embrace research and innovation, to push the boundaries of knowledge, and to make their mark on the world of computing and mathematics.

Editors

Progress in Computing and Mathematics Journal (PCMJ)
College of Computing, Informatics, and Mathematics
UiTM Cawangan Melaka

TABLE OF CONTENTS

LIST OF EDITORS	iii
PREFACE	iv
TABLE OF CONTENTS	v
SIMPLIFIED DRONE GAME FOR INITIAL REMEDIAL INTERVENTION FOR DYSPRAXIA AMONG KIDS	1
DEVELOPMENT OF STORAGE BOX WITH AUTOMATED AND REMOTE LOCK CONTROL SYSTEM IN WLAN ENVIRONMENT	16
COMPARATIVE ANALYSIS OF PASSWORD CRACKING TOOLS	29
SPORT FACILITIES FINDER USING GEOLOCATION	50
READ EASY AR: INTERACTIVE STORYBOOK FOR SLOW LEARNER	60
MATHMINDSET: GAME-BASED LEARNING TO REDUCE MATH ANXIETY	87
NETWORK PERFORMANCE ANALYSIS ON DIFFERENT ISP USING ONLINE CLASS PLATFORM ON DIFFERENT DEVICES.....	101
CIVIC HEROES; ENHANCING CIVIC AWARENESS THROUGH GAME-BASED LEARNING.....	115
ENHANCING COMMUNITY SQL INJECTION RULE IN INTRUSION DETECTION SYSTEM USING SNORT WITH EMAIL NOTIFICATIONS.....	124
LEARNING ABOUT MALAYSIA THROUGH GAME	138
STUDENT CHATROOM WITH PROFANITY FILTERING	150
ARCHITECTURE BBUILD AND DESIGN BUILDING THROUGH VIRTUAL REALITY	162
VEHICLE ACCIDENT ALERT SYSTEM USING GPS AND GSM	174
MARINE ODYSSEY: A NON-IMMERSIVE VIRTUAL REALITY GAME FOR MARINE LITTER AWARENESS.....	187
GAME BASED LEARNING FOR FIRE SAFETY AWARENESS AMONG PRIMARY SCHOOL CHILDREN.....	207
SIMULATING FLOOD DISASTER USING AUGMENTED REALITY APPLICATION	220
CRITICAL THINKER: VISUAL NOVEL GAME FOR BUILDING CRITICALTHINKING SKILLS	231
POPULAR MONSTER:.....	239
FIGURE SPRINTER: EDUCATIONAL ENDLESS RUNNING GAME TO LEARN 2D AND 3D SHAPE.....	252
AR MYDREAMHOUSE: AUGMENTED REALITY FOR CUSTOMISING HOUSE	265
RENTAL BIKE SERVICES WITH REAL TIME CHAT ASSISTANCE	308
IDOBI: IOT INTEGRATED SELF-SERVICE WASHING MACHINE RESERVATION SYSTEM WITH CODE BASED BOOKING TOKEN	321

TRADITIONAL POETRY OF UPPER SECONDARY STUDENTS VIA MOBILE APPLICATION	332
A MOBILE TECH HELPER RECOMMENDATIONS APPLICATION USING GEOLOCATION WITH AUTOMATED WHATSAPP MESSENGER.....	347
TURN-BASED ROLE-PLAYING GAME BASED ON MUSIC THEORY	370
FADTRACK: DEVELOPMENT OF VEHICLE TRACKING SYSTEM USING GPS	384
MENTALCARE: GAME-BASED LEARNING ON MENTAL HEALTH AWARENESS	397
HALAL INTEGRITY INSPECTOR:.....	411
MOBILE APPLICATION FOR REAL TIME BABY SIGN LANGUAGE RECOGNITION USING YOLOV8.....	434
TRAVEL TIME CONTEXT-BASED RECOMMENDATION SYSTEM USING CONTENT-BASED FILTERING	448
DETECTION SYSTEM OF DISEASE FROM TOMATO LEAF USING CONVOLUTIONAL NEURAL NETWORK	460
VIRTUAL REALITY (VR) FOR TEACHING AND LEARNING HUMAN ANATOMY IN SECONDARY SCHOOL.....	471
LEARNING KEDAH’S DIALECT VIA GAME-BASED LEARNING	490
AUTOMATED FACIAL PARALYSIS DETECTION USING DEEP LEARNING	504
ENHANCING CRIMINAL IDENTIFICATION: SVM-BASED FACE RECOGNITION WITH VGG ARCHITECTURE.....	517
WEB BASED PERSONALIZED UNIVERSITY TIMETABLE FOR UITM STUDENTS USING GENETIC ALGORITHM.....	528
SMART IQRA’ 2 MOBILE LEARNING APPLICATION	545
ANIMAL EXPLORER: A WALK IN THE JUNGLE.....	557
FOOD RECOMMENDATION SYSTEM FOR TYPE 2 DIABETES MELLITUS USING CONTENT-BASED FILTERING	569
WEB-BASED PERSONAL STUDY HELPER BASED ON LESSON PLAN USING GAMIFICATION	580
DIETARY SUPPLEMENT OF COLLABORATIVE RECOMMENDATION SYSTEM FOR ATHLETE AND FITNESS ENTHUSIAST.....	596
AUTOMATED HELMET AND PLATES NUMBER DETECTION USING DEEP LEARNING	611
VIRTUAL REALITY IN MATHEMATICAL LEARNING FOR SECONDARY SCHOOL.....	622
VIRTUAL REALITY (VR) IN CHEMISTRY LEARNING FOR SECONDARY SCHOOLS STUDENTS	634
GOLD PRICE PREDICTION USING LONG SHORT-TERM MEMORY APPROACH	651
ARTQUEST: A VIRTUAL REALITY ESCAPE ROOM FOR LEARNING ART HISTORY LESSONS.....	664
FIRE SURVIVAL: A FIRE SAFETY GAME USING GAME- BASED LEARNING.....	675
ANIMALAR: AN INTERACTIVE TOOL IN LEARNING EDUCATIONAL ANIMAL KINGDOM THROUGH AUGMENTED REALITY	690

SMART IQRA' 2 MOBILE LEARNING APPLICATION

Nurul Izzah Mohd Yunus

College of Computing, Informatics and Mathematics, Jasin Campus, Melaka
2021500907@student.uitm.edu.my

Siti Fatimah Mohd Rum

College of Computing, Informatics and Mathematics, Jasin Campus, Melaka
fatimah418@uitm.edu.my

Article Info

Abstract

This project focuses on teaching the al-Quran through Iqra', a successful method that enhances children's literacy by emphasizing direct reading practice. Iqra' consists of six volumes, covering hijaiyyah letters recognition to tajwid-compliant al-Quran recitation. Recognizing the importance of hijaiyyah letters, this project centres on Iqra' 2, introducing "baris atas" of hijaiyyah letters, connections of hijaiyyah letters, and hijaiyyah letters pronunciation. Mobile learning (m-learning) is explored for its potential to engage learners, especially preschool teachers interested in enhancing educational systems. Challenges like children's disinterest in learning al-Quran and the lack of systematic teaching aids are addressed. The project aims to design a 2-dimensional storyboard, develop instructional content for Smart Iqra' 2, and evaluate its usability. To develop this project, the methodology that is being used is the ADDIE model. This methodology is being used in this application because it is widely recognized and adopted in instructional design. Based on testing conducted with 33 preschooler respondents, the System Usability Scale (SUS) has confirmed that Smart Iqra' 2 is user-friendly, scoring an excellent 82.5%. This result assures an engaging and systematic mobile learning (m-learning) approach, promising optimal Quranic education experiences. In future work, the project plans to broaden the Quranic content coverage, encompassing advanced topics and levels to cater to diverse learning needs. Furthermore, an exploration into platform variation will be undertaken to enhance accessibility, ensuring the Smart Iqra' series is adaptable across various devices and operating systems for a more inclusive educational experience.

Received: February 2024

Accepted: August 2024

Available Online: October 2024

Keywords: Iqra' 2, Mobile Learning Application, ADDIE model.

INTRODUCTION

The study focuses on the methodologies of teaching and learning the al-Quran, specifically highlighting Iqra', al-Furqan, and al-Jabari. Iqra' is identified as a successful method for enhancing children's al-Quran literacy, consisting of six volumes with varying levels of difficulty. The emphasis is on direct reading practice, guiding learners from recognizing hijaiyyah letters to mastering tajwid-compliant al-Quran recitation.

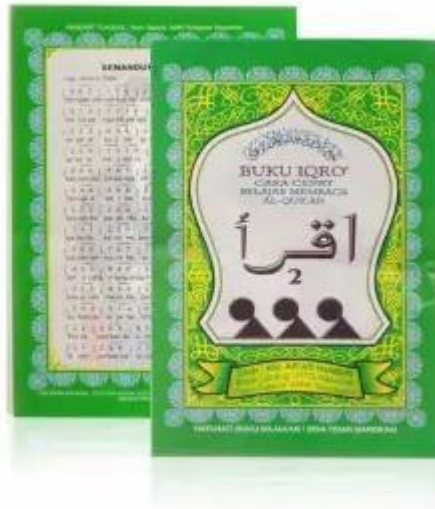


Figure 1: Iqra' 2 Book Cover

Mobile learning (m-learning) is increasingly capturing the interest of educators, presenting opportunities for collaborative engagement and enriched learning experiences (Kokkalia et al., 2016). A preschool teacher at Prasekolah SK Sungai Soi, Kuantan, Pahang, emerges as a pivotal stakeholder, employing Iqra' books and supplemental materials like flashcards, audio, video, and computers in the current teaching approach.

The problem with the current approach is causing a lack of interest among children in learning al-Quran and the absence of technology in current teaching aids used in al-Quran education. The interactive and enjoyable learning approach is proposed to address these issues, aligning with the preferences of tech-savvy children.

The project's objectives include designing a 2-dimensional storyboard for the Smart Iqra' 2 mobile learning application, developing the application, and evaluating its usability. The scope encompasses preschool students aged four to six, parents, and teachers. The application focuses on Iqra' 2, incorporating multimedia elements and quizzes for interactive learning.

The project's significance lies in enhancing children's understanding of reading al-Quran through an effective and user-friendly mobile learning platform. The application is seen as a valuable teaching aid for teachers and a tool for parents to provide early exposure to their children.

In summary, the research underscores the potential of mobile learning technology to simplify and make the learning process more enjoyable, particularly in the context of Iqra' and al-Quran literacy for children.

LITERATURE REVIEW

The Iqra' learning method, created by Ustadz As'ad Humam in Yogyakarta, Indonesia, is widely utilized in the Southeast Asian region. It covers all 29 Arabic characters and has proven effective for learners of all ages. According to Andini Adia Putri MD et al., (2023), the Iqra method emphasizes practising Quranic reading aloud and consists of six books. In Malaysia, the majority of primary schools currently employ the Iqra' method as their principal curriculum for teaching and learning the al-Quran (Jamaliah Ibrahim et al., 2014). This approach starts with teaching the first hijaiyyah word, 'alif', followed by 'ba', 'ta', and so on, making it practical for beginners to grasp Arabic readings (Ananda Bunga Mutiara Dani Nasution et al., 2023).

Comparing Iqra' to other methods, such as Al-Furqan and Al-Jabari, reveals differences in starting points, learning methods, and suitability for various age groups. The Iqra' method stands out with its focus on phonic-based learning, covering 29 characters and catering to individuals aged four and above (Jawawi et al., n.d.). Despite the effectiveness of Iqra' and its widespread use, children's interest in Islamic education faces challenges, including the weakness of pedagogy and traditional teaching methods (Mustafa & Salim, 2012; Abd Al-Rahman Salih Abd, 1982). The incorporation of technology, particularly mobile applications, presents an opportunity to enhance engagement in Islamic education (Nathan et al., 2022).

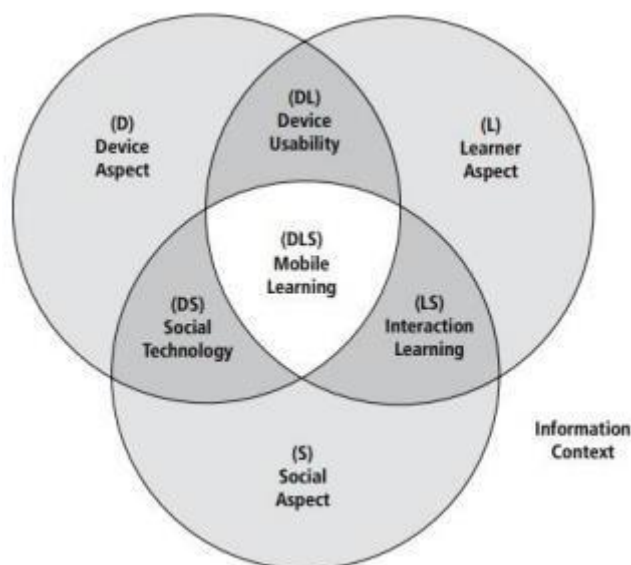


Figure 2 The FRAME model

The FRAME model, as shown in Figure 2 is an acronym for Framework for the Rational Analysis of Mobile Education, is a well-established model for usability evaluation in the realm of mobile education. Developed by Koole in 2006, it utilises a Venn diagram with intersecting circles representing device (D), learner (L), and social (S) aspects. The model's intersections, namely device usability (DL), social technology (DS), and interaction learning (LS), address the connection between device characteristics and cognitive tasks, communication facilitated by mobile devices, and the synthesis of learning and instructional theories, respectively. The FRAME model is instrumental in understanding usability, ensuring Smart Iqra' 2 aligns effectively with the principles of mobile education.

When considering the most appropriate development methodology for Smart Iqra' 2, three prominent options were evaluated: Rapid Application Development (RAD), Spiral, and ADDIE. Rapid Application Development (RAD) emphasizes iterative development and quick prototyping, allowing for immediate user feedback. While advantageous for projects requiring rapid adaptation, its potential limitations in handling large-scale educational content and potential oversights in planning make it less suitable for the structured learning approach of Smart Iqra' 2. The Spiral model, combining elements of Waterfall and iterative development, prioritizes risk management through repeated cycles. Though beneficial for projects with evolving requirements, its complexity and potential scope creep present challenges, especially considering the well-defined scope of Smart Iqra' 2. Ultimately, the ADDIE methodology is rooted in instructional design and stood out. Its systematic approach, stakeholder collaboration, and adaptability align well with the project's educational nature, ensuring a comprehensive and effective learning application for young users.

Mobile learning applications, such as Belajar Mengaji Al-Quran, Belajar Mengaji Iqra', and Belajar Al-Quran Iqro' 2, offer interactive and engaging approaches to Quranic learning. They leverage multimedia elements, provide different levels of difficulty, and include mini-games for an enjoyable learning experience. The proposed Smart Iqra' 2 application aligns with the successful features of existing apps, focusing on Iqra' Level 2, incorporating multimedia elements for engagement, and integrating level-specific mini-games to reinforce concepts.

This literature review explores the role of mobile applications in education, emphasizing the integration of 2D technology for visually engaging and interactive learning platforms. The wealth of information from articles, journals, and trusted sources underscores the significant potential of mobile applications in children's education. Examples like Belajar Mengaji Iqra',

Belajar Mengaji Al-Quran, and Belajar Al-Quran Iqro' 2 showcases the shared goal of educational enrichment, available on both AppStore and PlayStore. This project, rooted in comprehensive information, aims to develop an educational app with interactive features, guided by the FRAME model. The ADDIE methodology was chosen for its suitability over RAD and spiral methodologies, reflecting a careful consideration of project requirements and a preference for ADDIE's structured approach.

METHODOLOGY

The ADDIE (Analysis, Design, Development, Implementation, and Evaluation) methodology as shown in Figure 3 represents a comprehensive and systematic instructional design strategy, renowned for its effectiveness in creating successful learning solutions. The model was created as a framework for developing effective and efficient training programs (Dr Serhat Kurt, 2017). Its multifaceted framework guides the entire development process, ensuring a thorough exploration of learning needs and goals. ADDIE is chosen for this project due to its adaptability and scalability for various project sizes.

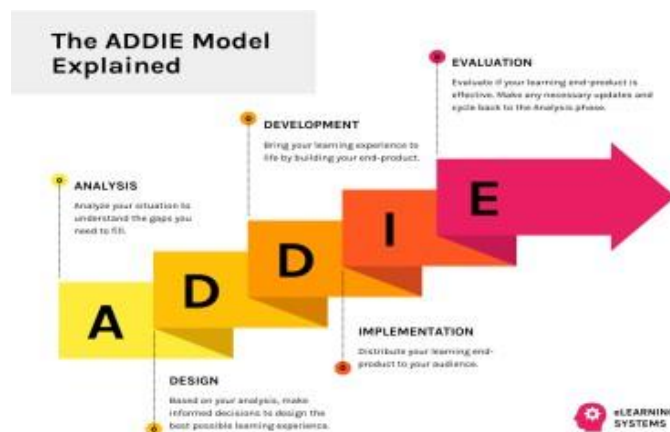


Figure 3 The ADDIE Model

In the initial stages of the ADDIE process, the Analysis phase explores deep into the project's learning goals, demands, and objectives. Through a meticulous examination of the target audience's characteristics, prior knowledge, and the specific requirements of the educational environment, this phase lays a solid foundation for subsequent stages. The flexibility of ADDIE becomes evident as it accommodates the unique demands of the project, whether it involves crafting a small-scale e-learning module or designing a large-scale corporate training program.

Moving into the Design phase, the ADDIE methodology emphasizes creating a comprehensive plan for the learning solution. This phase entails translating the insights gained from the analysis into a cohesive and effective design. System flowcharts and low-fidelity storyboards come to life during this stage, providing a visual representation of the application's structure and content.

The subsequent Development phase involves the creation of instructional materials, leveraging tools such as Construct 3, Adobe Animate 2023, Canva Pro, and Adobe Audition 2023. These tools contribute to the production of high-quality and engaging content, aligning with the project's learning objectives.

Implementation marks the actual deployment of the Smart Iqra' 2 mobile learning application. It is a crucial phase where design ideas materialize into practical learning tools, with collaboration among stakeholders ensuring a seamless process. Regular communication and feedback loops are vital during this stage to address any issues and improve the application based on user testing and input.

The final phase, Evaluation, focuses on assessing the usability of the Smart Iqra' 2 application. Usability evaluation is critical in determining how effectively the application facilitates the learning process and meets the educational goals. Continuous feedback and improvements are integral to this phase, ensuring that the application remains effective and user-friendly throughout its lifecycle.

The ADDIE methodology stands as a robust and flexible framework, offering a systematic and iterative approach to instructional design. Its adaptability, coupled with the use of appropriate tools and software, ensures the development of a well-planned and effective Smart Iqra' 2 mobile learning application.

RESULT AND DISCUSSION

"Usability," derived from "usable," refers to the ease with which something can be utilized (Yani & Mahargya Ningrum, 2019). This quality attribute measures how straightforward an interface is for user engagement (Sapitri et al., 2023). When evaluating a product for usability, its effectiveness, efficiency, and user satisfaction in achieving intended objectives are considered. Usability serves as a metric for assessing the interactivity and user-

friendliness of interfaces, whether in mobile applications or websites. It evaluates how well software can be understood, learned, utilized, and enjoyed by users in specific situations.

Obtaining feedback from users is vital for assessing the effectiveness of Smart Iqra' 2 in achieving its goals. System Usability Scale (SUS) questionnaire is employed to gather this feedback, gauging users' perceptions of the app's ease of use and overall satisfaction. The questionnaire features statements that users rate on a scale from strongly disagree to strongly agree. By analyzing the collected scores, we can determine the app's usability, identifying strengths and areas for improvement. This approach ensures that Smart Iqra' 2 not only facilitates learning but also delivers a user-friendly and effective experience for those engaging with Quranic content.

The System Usability Scale (SUS), developed by John Brooke in 1986, is a quick and reliable testing method for assessing various products and services (Galuh Sembodo et al., 2021). This post-development evaluation approach involves using a questionnaire to measure users' perceptions of software usefulness. The SUS method provides a subjective perspective on system usability and enables swift evaluation through a 10-item post-test questionnaire, as detailed in Table 1 (Ahmad et al., 2022). Despite its speed, research suggests that the SUS is more thorough than initially perceived (Moura et al., 2021).

Table 1: SUS Questionnaire

Code	Question
Q1	I think that I would like to use Smart Iqra' 2 frequently.
Q2	I found Smart Iqra' 2 unnecessarily complex.
Q3	I thought Smart Iqra' 2 was easy to use.
Q4	I think that I would need the support of a technical person to be able to use Smart Iqra' 2.
Q5	I found the various functions in Smart Iqra' 2 were well integrated.
Q6	I thought there was too much inconsistency in Smart Iqra' 2.
Q7	I would imagine that most people would learn to use Smart Iqra' 2 very quickly.
Q8	I found Smart Iqra' 2 very awkward to use.
Q9	I felt very confident using Smart Iqra' 2.
Q10	I needed to learn a lot of things before I could get going with Smart Iqra' 2.

The way to calculate system usability scale measurement results is described as follows:

1. For each question in odd order is reduced by one value. Example question 1 has a score of 4. Then subtract 4 by 1 so that the score for question 1 is 3.
2. For each question in an even order, the score is deducted from five. Example question 2 has a score of 1. Then subtract 5 by 1 so that the score for question 2 is 4.

3. Add the values of the even-numbered and odd-numbered statements. Then the result is multiplied by 2.5

Three perspectives are used to conduct evaluations using the System Usability Scale (SUS): acceptability, grade, and adjective rating. Acceptability is broken down into three categories: not acceptable, marginal (low and high), and acceptable. The second is grade, which is broken down into A, B, C, D, and F levels. The adjective rating is the final category and has levels that span from worst imaginable to best imagined. Figure 4 below shows the stages of the SUS technique (Pratiwi et al., 2023).

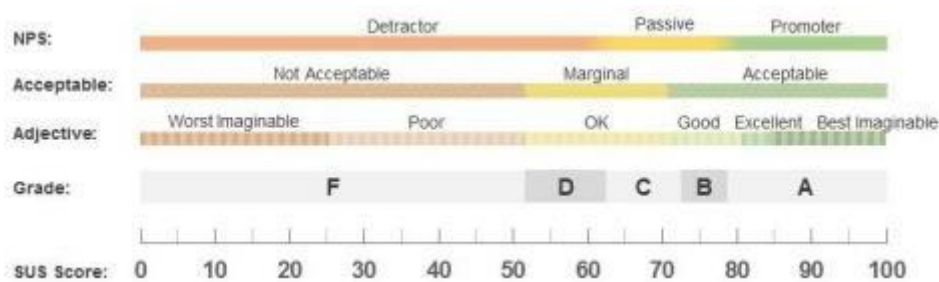


Figure 4 System Usability Scale (SUS) Method Assessment Score

The questionnaire was then sent out to 33 respondents who are legal guardians of kids within the age range of 4 – 6 years old at Prasekolah SK Sungai Soi, Kuantan, Pahang. The questionnaire was to be completed by the guardians after the kids had used the Smart Iqra’ 2 mobile learning application. Following the completion of the questionnaire, the researcher will process and do a SUS-compliant analysis of the data. The findings of this study include recommendations for enhancing the Smart Iqra’ 2 usefulness.

In this study, data was collected using a questionnaire that included 10 items from the SUS method. The questionnaire used in this study was distributed to 33 respondents who used the Smart Iqra’ 2 mobile learning application. After the questionnaires were distributed and received by the respondents, the questionnaire data of each respondent was calculated. The researcher distributed the SUS questionnaire, and the results are shown in Table 2 below. Strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5) are the available response options.

Table 2 SUS Questionnaire Result

Resp	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	4	2	4	3	4	3	4	2	4	1
2	5	1	5	1	5	1	5	1	5	1
3	5	3	5	2	5	2	5	2	5	1
4	4	1	5	2	5	1	4	1	5	3
5	4	4	5	5	3	2	5	1	4	3
6	5	4	4	4	4	2	4	2	4	4
7	5	4	4	3	4	2	4	2	5	2
8	4	4	5	3	4	2	4	1	5	4
9	4	4	5	1	5	1	5	1	5	2
10	4	2	5	3	2	2	4	1	5	2
11	5	2	4	1	4	2	4	1	5	2
12	4	2	4	2	4	2	4	2	4	2
13	5	1	5	1	5	1	5	1	5	1
14	4	2	4	2	4	2	4	2	4	2
15	4	1	4	2	3	2	4	1	4	1
16	4	1	5	1	4	3	5	2	4	1
17	5	2	5	3	4	2	5	2	5	2
18	4	1	5	2	4	2	5	2	3	3
19	4	2	4	2	4	2	4	2	4	2
20	4	1	4	1	4	1	5	1	5	1
21	5	1	5	1	5	1	5	1	5	1
22	4	3	4	2	4	3	4	1	5	1
23	4	1	5	2	5	1	4	1	4	3
24	4	2	4	2	4	2	4	2	4	2
25	5	1	5	1	5	1	5	1	5	1
26	4	2	4	2	4	2	4	2	4	2
27	5	1	5	2	4	1	5	2	4	1
28	4	2	4	1	5	1	4	2	5	1
29	4	2	4	2	4	2	4	1	5	1
30	4	2	5	1	3	1	5	2	4	1
31	5	1	5	2	4	1	5	1	3	1
32	4	2	5	2	5	1	4	1	5	2
33	4	2	5	1	4	3	4	1	3	1

Following data collection, the subsequent stage involves processing. In the SUS questionnaire, questions bearing even numbers are framed negatively, while those with odd numbers are positively phrased. The scoring involves subtracting 1 for odd-numbered questions and subtracting 5 for even-numbered questions. The combined results are then multiplied by 2.5. The outcomes of the SUS evaluation are presented in Table 3 below.

Table 3 Smart Iqra' 2 SUS Score

Average SUS Score	Grade	Adjective Ratings	Acceptability
82.5	A	Excellent	Acceptable

After testing Smart Iqra' 2 with the System Usability Scale (SUS), we gathered feedback from 33 people. This large group of users gives us a strong understanding of how usable and satisfying the mobile learning app is for everyone.

Smart Iqra' 2 received an average SUS score of 82.5, which falls in the "Acceptable" range on the scale. This is a good achievement and shows that users had a positive experience during testing. The SUS method, with its mix of positive and negative questions, helped us get a detailed understanding of how easy the app is to use. The even-numbered questions, which were negative, and the odd-numbered questions, which were positive, together gave us a full picture of the app's usability.

Additionally, Smart Iqra' 2 received an "A" grade and an "Excellent" rating. This shows that the app is doing well in providing a user-friendly and effective learning experience. These achievements highlight the careful attention given to how the app looks, how users interact with it, and how easy it is to use in creating Smart Iqra' 2.

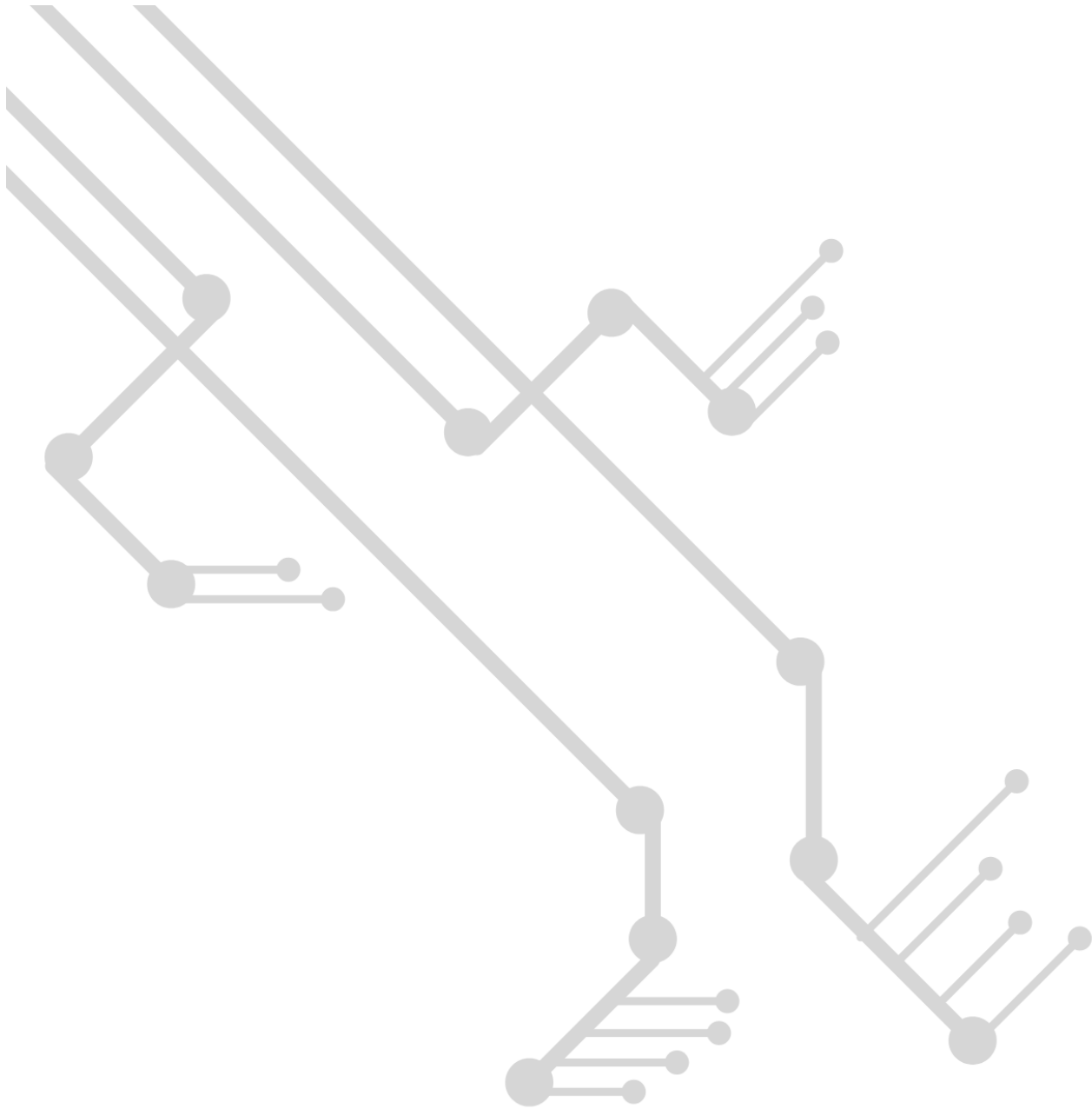
The positive SUS testing outcomes not only affirm Smart Iqra' 2 as a well-designed and functional mobile learning application but also underline its capacity to meet the diverse needs and expectations of users engaged in Quranic education. The user-centric focus of the SUS testing process, involving 33 respondents, has provided actionable insights into areas of strength and opportunities for enhancement, paving the way for continual improvement and refinement of Smart Iqra' 2 to ensure an optimal learning experience for its users.

REFERENCES

- Abd Al-Rahman Salih Abd. (1982). *Educational Theory a Qur Anic Outlook*. <https://philpapers.org/rec/ALLETA-2>
- Ahmad, A. E., Kusriani, K., & Sudarmawan, S. (2022). Usability Evaluation of Office Stationery Procurement Service and Management System Using System Usability Scale. *Proceeding - 6th International Conference on Information Technology, Information Systems and Electrical Engineering: Applying Data Sciences and Artificial Intelligence Technologies for Environmental Sustainability, ICITISEE 2022*, 498–502. <https://doi.org/10.1109/ICITISEE57756.2022.10057706>
- Ananda Bunga Mutiara Dani Nasution, Elan Ilyas Sidiq, Muhamad Lufti Yasin Faujan, & Imam Tabroni. (2023). Increasing Understanding of Fiqh: Problem Based Learning (PBL) Drives it All. *International Journal of Integrative Sciences*, 1(3), 67–80. <https://doi.org/10.55927/ijis.v2i2.3088>

- Andini Adia Putri MD, Mahdalia Zahra, Putri Wahyu Octavia Ningrum, & Imam Tabroni. (2023). Singing Method: Easily Memorize Arabic Vocabulary and Mahfudzat. *International Journal of Scientific Multidisciplinary Research*, 1(2), 85–96. <https://doi.org/10.55927/ijsmr.v1i2.3357>
- Dr Serhat Kurt. (2017). *ADDIE Model: Instructional Design - Educational Technology*. <https://educationaltechnology.net/the-addie-model-instructional-design/>
- Galuh Sembodo, F., Fadila Fitriana, G., & Prasetyo, N. A. (2021). Evaluasi Usability Website Shopee Menggunakan System Usability Scale (SUS). In *Journal of Applied Informatics and Computing (JAIC)* (Vol. 5, Issue 2). <http://jurnal.polibatam.ac.id/index.php/JAIC>
- Jamaliah Ibrahim, N., Yamani Idna Idris, M., & Zulkifli Mohd Yusoff, M. Y. (2014). Computer Aided Pronunciation Learning For Al-Jabari Method: A Review)*(. In *International Journal of Quranic Research* (Vol. 6, Issue 2).
- Jawawi, D. N. A., Universiti Teknologi Malaysia, Institute of Electrical and Electronics Engineers, Malaysian Software Engineering Conference 8 2014.09.23-24 Langkawi, MySEC 8 2014.09.23-24 Langkawi, Software Engineering Postgraduates Workshop 5 2014.09.23 Langkawi, & SEPoW 5 2014.09.23 Langkawi. (n.d.). *8th Malaysian Software Engineering Conference (MySEC), 2014 23-24 Sept. 2014, Langkawi, Malaysia ; co-located [with] the 5th Software Engineering Postgraduates Workshop (SEPoW 2014)*.
- Kokkalia, G., Drigas, A. S., & Economou, A. (2016). Mobile learning for preschool education. *International Journal of Interactive Mobile Technologies*, 10(4), 57–64. <https://doi.org/10.3991/ijim.v10i4.6021>
- Moura, J., Estrela, M., Almeida, A. M., Ferraz, I., Figueiras, A., Roque, F., & Herdeiro, M. T. (2021). A usability study of pharmacists' perceptions toward an online course for respiratory infections and antibiotic use. *Procedia Computer Science*, 181, 269–276. <https://doi.org/10.1016/j.procs.2021.01.146>
- Mustafa, Z., & Salim, H. (2012). *Journal of Education and Practice* www.iiste.org ISSN (Vol. 3, Issue 13). Online. <https://www.researchgate.net/publication/259191901>
- Nathan, T., Muthupalaniappen, L., & Muhammad, N. A. (2022). Prevalence and description of digital device use among preschool children: A cross-sectional study in Kota Setar District, Kedah. *Malaysian Family Physician*, 17(3), 114–120. <https://doi.org/10.51866/oa.25>
- Pratiwi, P. Y., Ardwi Pradnyana, I. M., & Winda Damayanti, N. K. (2023). *Usability Analysis on Digital Library Information System using System Usability Scale (SUS)*. 293–298. <https://doi.org/10.1109/ieit59852.2023.10335582>
- Sapitri, A., Saputra, M. W., Putri, M. A., & Efendi, Y. (2023). Redesign Aplikasi M-Banking Metode Lean UX Dengan Pengujian A/B Testing (Studi Kasus BSI). *SATIN - Sains Dan Teknologi Informasi*, 9(2), 112–124. <https://doi.org/10.33372/stn.v9i2.1038>

Yani, H., & Mahargya Ningrum, G. (2019). Evaluasi Usability Situs Web Kemenkumham Kantor Wilayah Jambi Dengan Metode Usability Test Dan System Usability Scale. In *Research : Journal of Computer, information system, & technology management Online* (Vol. 2, Issue 1). <https://jambi.kemenkumham.go.id/>



PCMJ

Progress in Computing and Mathematics Journal



UNIVERSITI
TEKNOLOGI
MARA

Cawangan Melaka

eISSN 3030-6728



9 773030 672004