

## Islamic Educational Mobile Application Based on Play Therapy for Autism Children

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**Abstract:** Autism Spectrum Disorder (ASD) is becoming more prevalent among children worldwide. Three main issues that affect ASD children are behavior, communication, and social interaction. Children with special needs have the same right to engage in education, especially religious education. The main concern in delivering education to these special children is how to maximize their learning. They need teachers and parents to recognize their unique needs and abilities. ASD children have problems staying focused in learning. They are also not interested in lengthy content and linear materials such as books. Currently, the development of mobile applications is growing as many could benefit from it. This research will suggest a development of an Islamic educational mobile application for ASD children, which is built on the idea of enhancing visual and attentional skills based on play therapy. Since it is commonly known that children with ASD do not play in the same manner as regular children, the use of play therapy with ASD children has gained attention as a research topic. Auto play therapy is the term for the play therapy used with children who have ASD. The Mobile Application will include parent's engagement as well for learning monitoring. This project was developed using Mobile Application Development Life Cycle (MADLC). The result and findings defined that most users agreed that this mobile application was easy to use, not complex, consistent, integrated well with elements and they are willing to use it frequently.

**Keywords:** Autism, Educational technology, Mobile education, Mobile application, Play therapy

### 1 Introduction

The number of children diagnosed with autism keep rising around the world. Autism, known as autism spectrum disorder (ASD), is a neurological condition that has a profound influence on people's life. According to [1], ASD is a developmental disorder indicated by significant impairment in social interaction and communication. Children within their first three years of life usually endure ASD. This disorder cannot be cured, but it could be managed if detected and treated early. Autism can impact everyone, no matter the ethnicity, educational level, social station, or economic status. Socializing, communication, and behaviour are three significant issues that children with autism encounter [2]. Because of impairment in communication, almost half of children with autism have difficulty establishing functional language.

Raising a child with autism can be difficult for parents, guardians, and families at times. Parents must persevere through adversity with patience to provide the best possible care for their ASD children.



This frequently entails feelings of misery, suffering, and frustration, as well as high costs, time, and energy spent dealing with autistic children who are so diverse and unique. While parents must go through hard times in handling ASD children, they still need to provide them with proper education especially religious education. Religious education is important as it could carry someone's faith in life and bring calmness to the soul. Learning religious education requires students to understand the abstract concept. This is a demanding task as ASD children have problems in doing so. Therefore, teachers or parents need to plan on material selection in introducing religious education to them.

Visual-spatial learners are frequently ASD children and other types of special needs. Their learning style is characterized by studying people or events, paying close attention to every detail, especially when it relates to topics that interest them, and taking pleasure in visual stimulation. They would like color, graphs, photos, and maps. These kids need to see the teacher's body language and facial expression to completely comprehend what they are being taught. They are not interested in lectures or lengthy speeches using complicated jargon. They can even associate it with a particular word, tone, or smell to recall mental wandering. They are very good at visualizing things and learn best from visual materials [3].

Children with ASD, however, are not interested in learning from books, particularly when it is related to abstract ideas like religious education. One of the best methods for teaching autistic children social and emotional skills is play therapy. Even though they may play differently from neurotypical kids, play is a crucial means of self-expression for kids with autism. Play therapy is mainly intended to help children to honor their unique mental abilities and developmental levels. The main aim of play therapy is to prevent or solve psychosocial difficulties and achieve optimal child-healthy growth and development. Play therapy helps children with autism to engage in play activities of their interest and choice to express themselves in the most comfortable ways. It changes their way of self-expression from unwanted behaviors to more non-injurious expressive behavior using toys or activities of their choice as their words. Play therapy also helps these children to experience various interaction styles [4].

This paper highlights the importance of play therapy to ASD children and how this concept can be embedded in mobile applications to help ASD children learning Islamic education. As we know, ASD children learn differently than normal children. A learning process that is confined to textbooks is not interactive. This is because textbooks can only be read and seen. Information and communications technology (ICT) is currently experiencing modifications and advancements that provide a variety of learning and interaction opportunities to a wide range of demographic segments. The development of digital spaces tailored to the needs of individuals with ASD has increased dramatically in recent years. Research on their applicability in clinical medicine and therapy is just getting started, as [12] demonstrates.

Thus, this learning tool is suitable and so much interactive for ASD children. This mobile application could enhance the functionality of the existing system. It exposes and teaches ASD children about the Arabic letters and sounds, the pillars of Islam, the pillars of Iman and daily duas as well as creating a learning environment that will be engaging and will encourage them to focus. By using this educational mobile application, parents can keep track of their ASD children's learning progress. The technique that will be applied in this study is Mobile Application Development Life Cycle (MADLC), which has seven primary steps: identification, design, development, prototype, testing, development, and maintenance.

## 2 Literature Review

This section will discuss about ASD and previous related research that introduced Islamic mobile application education for ASD children. This section will also include a list of topics commonly found in the existing Islamic educational mobile application. Lastly, this section will highlight the purpose of play therapy in helping ASD children.

## **A Autism Spectrum Disorder (ASD)**

According to [5], a series of complex neurodevelopmental impairments known as ASD are characterized by typical repetitive patterns of behavior, social deficiencies, and communication issues. Children with ASD might vary substantially from one another. The spectrum ranges from profound impairments to slight difficulties. In summary, the child with ASD is not geared into the patterns of interaction which are the vehicle that brings children into the already organized social world. Due to their limitation in social skills, ASD children need special teaching strategies.

## **B ASD Children Learning Style**

Children with ASD are commonly visual-spatial learners. Most of them learn best by handling, manipulating, and touching materials and objects. Their constant urge for activity and exploration prevents them from maintaining long-term attention. When their abilities are supported, visual-spatial learners can perform at their best. They can be great visualizers, continuously creating a framework of ideas and are creative. However, they also face obstacles in learning including difficulties in switching between topics, heightened environmental sensitivity, poor rote memory, and numerous other potential weaknesses [6]. Therefore, teachers and parents should prepare more visual aids and multimedia to support the learning process which takes more effort and commitment in teaching their best. As Islamic education introduces abstract concepts which require understanding, teachers and parents can utilize information technology and multimedia to encourage ASD children to learn Islamic topics.

## **C Mobile Application for ASD children**

Children with ASD can use a variety of technological tools to assist them in overcoming developmental challenges [1]. A proper instructional experience may be provided to assist or encourage learning activities outside of the classroom since mobile devices widen the learning experience or spectrum at all times and in all places. ASD children spend on average 4.5 hours per day engaging in technology-based activities than in nontechnology-related ones, which are from 2.8 hours per day [7]. Since ASD children have problems in socializing, mobile applications would be advantageous for them as a tool for learning.

There are many mobile education applications available for children with special needs. [13] developed an application named PICAA for children with special educational needs. Autism language and cognitive therapy with Mental Imagery Therapy for Autism (MITA) application was developed by [14]. This application is a game that requires attention, and visual and auditory discrimination. [15] focused on the use of applications that address creative processes in artistic education.

There are limited number of Islamic education mobile applications for ASD children. This section will discuss existing mobile applications.

The thesis "Features of Mobile Applications for People with Autism in a Post COVID-19 Scenario" by [5] represented a new approach by examining the use of serious games with a specific focus on supporting the learning process of the Al Quran among students with learning difficulties, especially for children with severe autism. This is because numerous applications and games have been created recently to improve the learning process for kids with autism. To teach the most fundamental concept of learning the Al-Quran, which focuses on learning Arabic letters, a prototype Quranic game was created (known as *Hijaiyah* letters). The purpose of the Quranic game is to highlight and capitalize on the strengths of the children with severe autism rather than only on their weaknesses.

e-DOA, or electronic DOA, is an application that uses an Android mobile device, according to the journal article "Doa Mobile Application for Autism Children (e-DOA)" by [6]. This application uses phones as a teaching tool for Muslims on *doa* prayers in daily life. A smartphone application called e-DOA will be created to improve the operation of the earlier system. This program is designed for mobile devices. It includes the meaning and the daily *doas* in Arabic writing. Green was chosen as the

theme colour, and the language is Indonesian language. *Doas* are offered in Arabic, and the navigation is straightforward. Users can also learn how to read and translate. It also includes interactive *doas* for *Ramadan* in addition to the 10 daily *doas*. This mobile application uses a certain colour scheme that is not interactive for the user base, which is youngsters. Kids interact more when given a variety of colour schemes, like the colour scheme for the red, green, and blue (RGB). Additionally, the application was created in the Indonesian language.

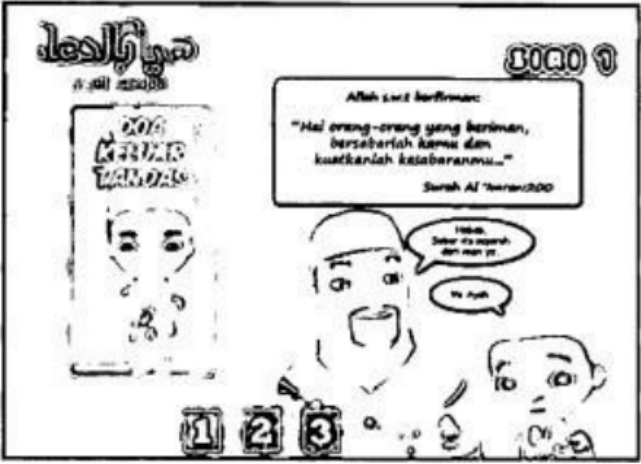


Figure 1: First activity of e-DOA

[7] which represented the design and production of a mobile game for kids between the ages of 5 and 9. The ABATA employs construction elements based on the idea of "Script-Story Therapy." The gaming platform runs the system on a specific type of device. It has been demonstrated that serious games can entice kids with ASD to play the games.



Figure 2: First activity of ABATA application

Engaging Children with Severe Autism in Learning Al-Quran through Serious Game by [8], aimed at teaching the most fundamental concept of learning Al-Quran which focuses on learning Arabic letters, a prototype Quranic game was created (known as *Hijaiyah* letters). The purpose of the Quranic game is to highlight and capitalize on the strengths of the children with severe autism rather than only on their weaknesses.



Figure 3: First activity of Learning Al-Quran through serious game

Besides, another similar works found in an article written by [9] which entitled “Applying Mobile Application Development Life Cycle in the Development of Fasting Tracker Android Application”. The system's goal was to create a product based on Naqli-Aqli Integration as a contribution to the advancement of the ummah. The Muslim community and organizations can profit greatly from this Android software called "Fasting Tracker Android Application" by gaining a comprehensive grasp of *fiyah*. In addition, the system will be more organized, precise, effective, and user-friendly. The offered calculator system is intended to reduce human mistakes. The database will house all the data, saving space, money, and prevent missing information.



Figure 4: First activity of Fasting Tracker

Finally, [10] also developed a project in her journal entitled “An Interactive Islamic Mobile Application for Children – *“Hidup Cara Rasullullah”*”. To provide kids a better knowledge of the notion of Hadiths in daily life, the project will create the interactive mobile application *“Hidup cara Rasullullah.”* The goal of the project is to create an Android-based mobile application that will allow children between the ages of four and six to learn about Islamic hadiths on their own. To assess the existing learning environment for Islamic subjects in Malaysia, interviews with instructors at Taska and Tadika Mutiara Islamic Montessori in Sri Iskandar, Perak, will be performed. Muslim children residing in Malaysia will be the target audience for *“Hidup Cara Rasullullah,”* since Arabic and Bahasa will be the primary languages. As part of Malaysian self-learning, the author is required to do preparatory research on Islamic Hadiths and to create a storyboard for the application that will be created.

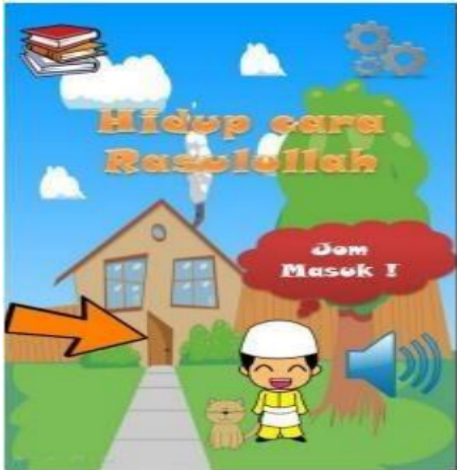


Figure 5: First activity of *Hidup Cara Rasulullah*

**D Play Therapy**

According to [11], play therapy can teach a child several important lessons such as respecting and accepting themselves, realizing that their emotions were valid, have a responsible emotional expression, self-awareness, problem-solving creativity, and resourcefulness, and finally, the ability to make decisions and take responsibility for them. Therefore, blocks of various materials, sizes, forms, and colors, dolls and puppets, painting supplies like crayons, markers, paint, paintbrushes, and paper in various colors, animal figures, marbles, balls of various sizes, and puzzles are some of the typical items used during play therapy. The use of play therapy among ASD children has become a popular research issue since it is widely believed that ASD children do not play in the same way that typical children do. The play therapy utilized with ASD children is known as auto play therapy. The child center play therapy (CCPT) case study for an autistic child was documented by psychologist Morgenthal [7]. She observed a rise in both spontaneous symbolic play behavior and communication abilities with her patient during her two years of study.

The multimedia used in mobile applications could attract ASD children to stay focused on their learning. The colors, sound, images, and video that come together in one application could help ASD children learn best as they are visual-spatial learners.

**3 Methodology**

This application was developed using Mobile Application Development Lifecycle model (MADLC). It involves seven main phases as shown by Figure 6.

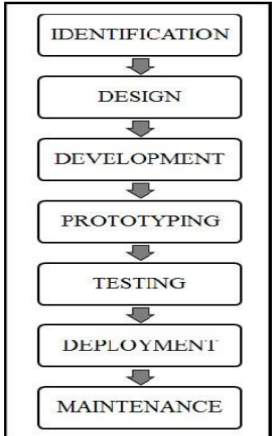


Figure 6: Phases of MADLC

### i. Identification Phase

In this phase, objectives of the project are determined. Information was gathered from the users through interviews and online survey. Below is a sample of interview questions for this project:

- a. How old is your autistic child/student?
- b. Do you face any problems with the current process of teaching Islamic education to your autistic child/student?
- c. What are you looking for a change? Would you like to have a mobile application to be used in teaching Islamic education to your autistic child/student?
- d. Do you want to make your autistic children/students have access into the mobile application?
- e. Do you want to implement interactive elements such as image and audio into the mobile application so it could speed up the learning process?
- f. Do you want the knowledge of your autistic child/student to be tested after the learning process such as quiz section feature?
- g. Would you like to have access to the mobile application to track your child's/student's progress through the result quiz report?

For this project, the system requirements are obtained using a Google Form survey. It is very easy to create an online survey with Google Form and collect responses in an online spreadsheet. Additionally, it may create a survey and distribute invitation by email or a URL. Each response can be shown in a single row of a spreadsheet, with each question appearing in its own column. Parents or Caretaker Satisfaction Survey towards Manual Islamic Education Tools for Autistic Kids has been conducted among parents and caretakers or kindergarten teachers of ASD kids in Kelantan. There were 20 respondents who had responded to the survey. Some of the results of the online survey are presented below:

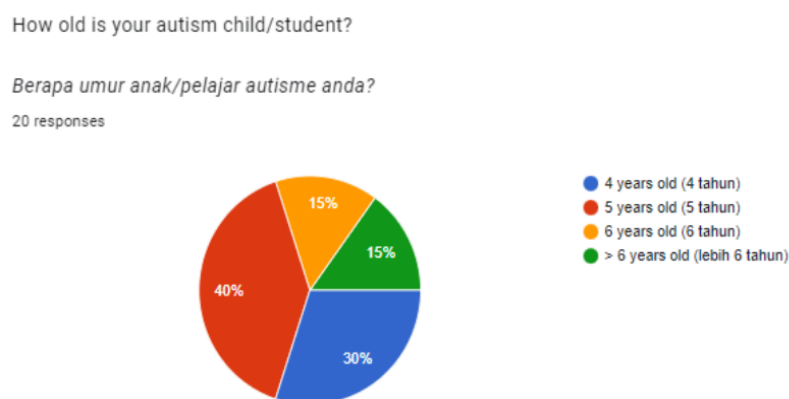


Figure 7: Age of autism children

In Figure 7 above, it appears that 30% respondents have 4-year-old autistic child/student, 40% for 5 years old, 15% for 6 years old and another 15% have more than 6 years old autistic child/student.

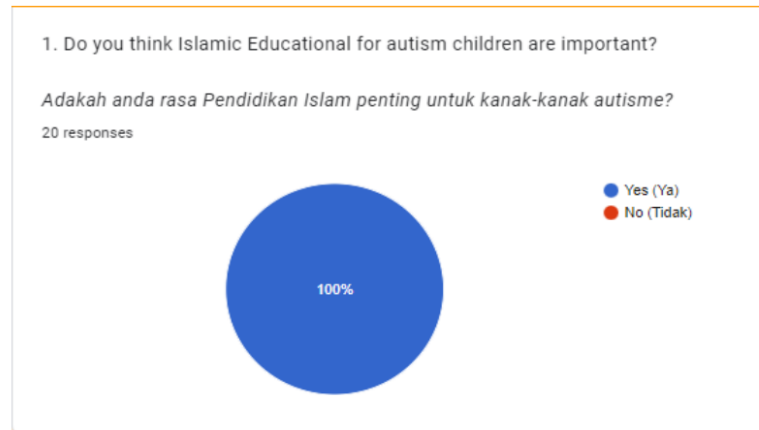


Figure 8: Percentage of Islamic Educational importance

Figure 8 above describes that 100% of respondents answered yes for the importance of Islamic Education for autistic children.

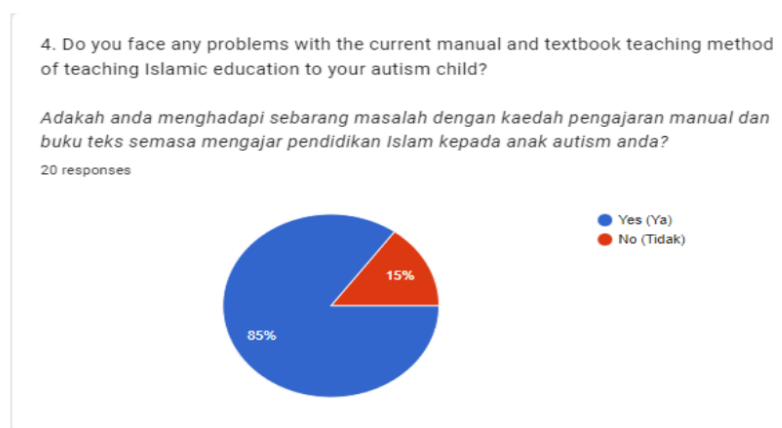


Figure 9: Percentage of problems with the current textbook to learn Islamic education.

Figure 9 indicates that 82% of parents and teachers have problems in using textbooks as a method to teach Islamic education to ASD children. Figure 8 and Figure 9 state a clear picture that there is a need for an interactive teaching method to solve ASD children's learning problem. It is also important to identify hardware and software requirements to make sure the application could be developed properly and will be able to be delivered on time.

## ii. Design Phase

User interface and functionality should be the primary concerns during the design phase. The functionality component of the application focuses on how it functions and what users can do with it, as opposed to the user interface, which describes what users see and interact with in the application. The design specification and construction of the mobile application will be based on the requirement idea that was specified in the previous phase. To illustrate the functional and non-functional requirement entity relationship diagram (ERD) and context diagram case as shown by Figure 10 and Figure 11 were created in this process using Draw.io tool to ease and assist the progress of project development.

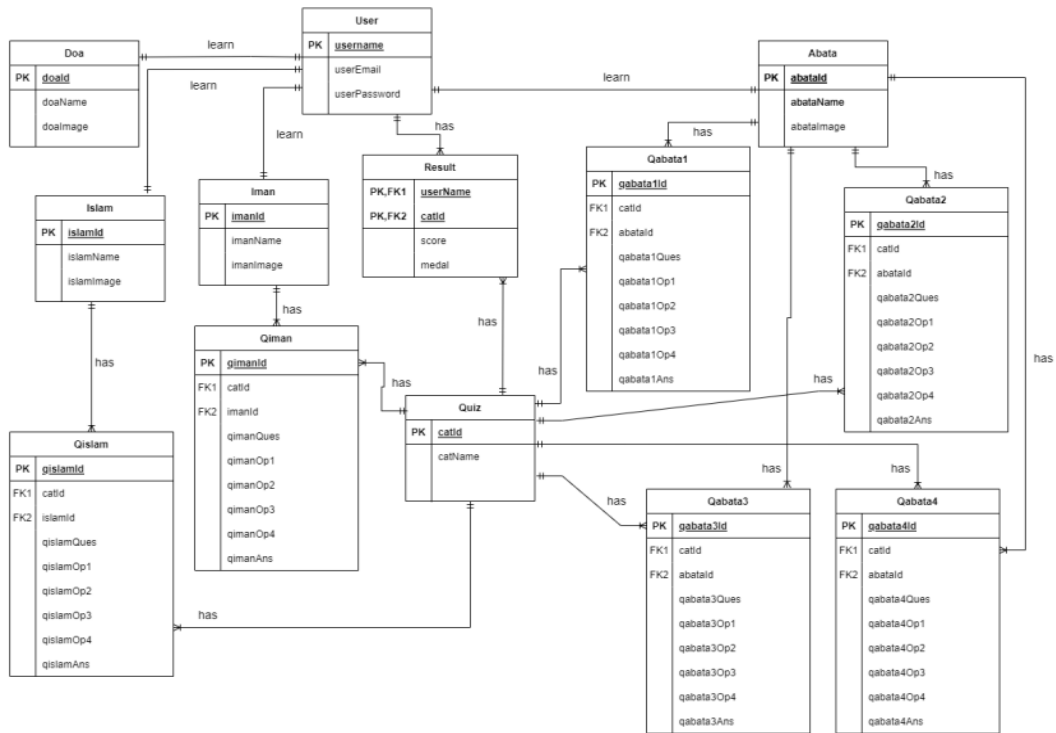


Figure 10: ERD of Islamic Educational Mobile Application Based On Play Therapy For Autistic Children

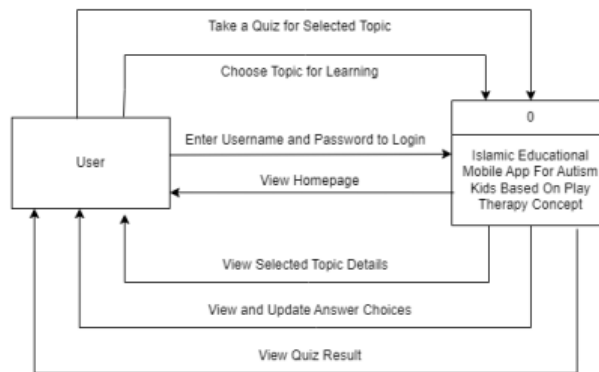


Figure 11: Context Diagram of Islamic Educational Mobile Application Based on Play Therapy for Autistic Children

### iii. Development Phase

Diagrams including Entity Relational Diagram (ERD) and Context Diagram (CD) are established as a guidance during the development of this system. All the diagrams will be explained in detail first in the developmental phase. Then, a proposed mobile application will be coded according to the design developed during the previous stage which follows the design phase.

### iv. Prototyping Phase

Before fully entering the building stage, early ideas of this mobile application might be tested by creating a prototype to determine what may be lacking or troublesome. At this stage, each prototype's functional requirements were examined, put to test, and then delivered to the users for review. Parents and caretakers who have autistic children were provided access to this mobile application in exchange for their input. Figure 12 to Figure 17 demonstrates the prototypes of the mobile application.

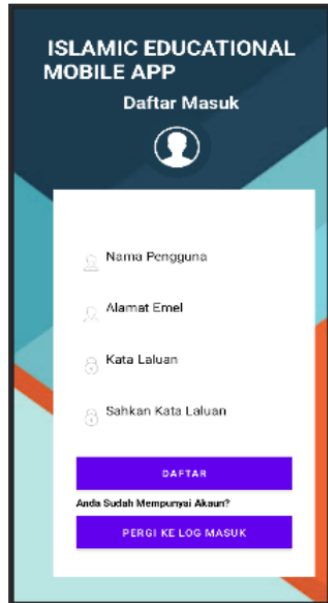


Figure 12: Registration activity

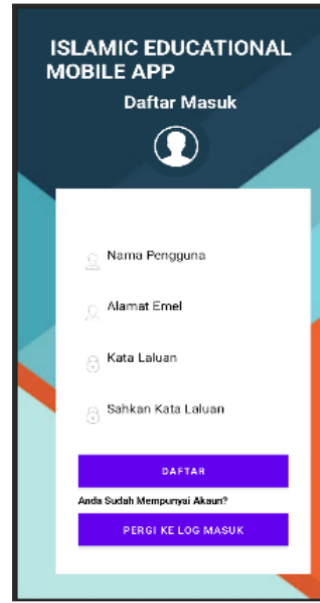


Figure 13: Log in activity

For first time user, they need to register to use the application. Then, they will be able to login to the application. This activity is shown by Figure 12 and Figure 13.

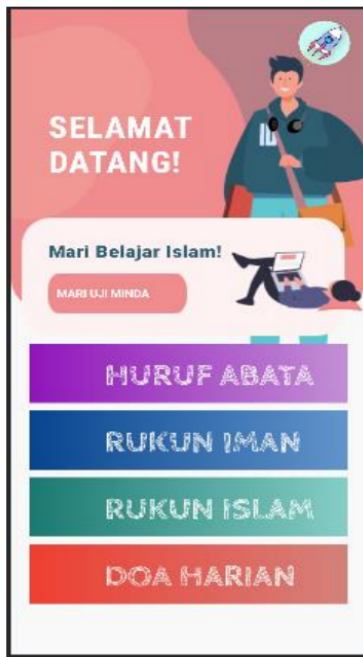


Figure 14: Menu activity



Figure 15: Menu activity



Figure 16: Doa activity



Figure 17: Quiz activity

Figure 14 to Figure 17 demonstrates the menu activity and modules available in the application.

#### v. Testing

This system testing applied the Heuristic Evaluation. It is a thorough analysis of a product's user interface with the goal of identifying and fixing any usability problems that could occur when customers interact with the product. The project's sample of Heuristic Evaluation question is provided in Table 1.

Table 1: Heuristic Evaluation Sample Questions

No.	Question
1.	I think that I would like to use this mobile app frequently.
2.	I found the mobile app unnecessarily complex.
3.	I thought the mobile app was easy to use.
4.	I think that I would need the support of a technical person for guidance in using this mobile app.
5.	I found the various functions in this mobile app were well integrated.
6.	I thought there was too much inconsistency in this mobile app.
7.	I would imagine that most people would learn to use this mobile app very quickly.
8.	I found the mobile app very cumbersome to use.
9.	I felt very confident using the mobile app.
10.	I needed to learn a lot of things before I could get going with this mobile app.

#### vi. Deployment Phase

After the software testing phase was finished and there were no more faults or errors in the system, the final deployment step started. Once the system had been tested and had successfully completed each stage of testing, it was ready to move on. This shows that the system was prepared for use in a real-world environment by all end users. Users can test out the application once it has been published.

**vii. Maintenance Phase**

The maintenance phase starts once the product is up and running. It comprises adjusting a system's functionality, bug fixes, security upgrades, or user demands. To prevent alterations from negatively affecting system's performance or security, processes for change management should be established.

**4 Results and Discussion**

After the mobile application was finished, an evaluation was conducted to determine its usability and efficiency. The evaluation is done among parents and caretakers or kindergarten teachers of ASD children in Kelantan. There were 20 respondents who answered the survey. Some of the heuristic evaluation results are presented below:

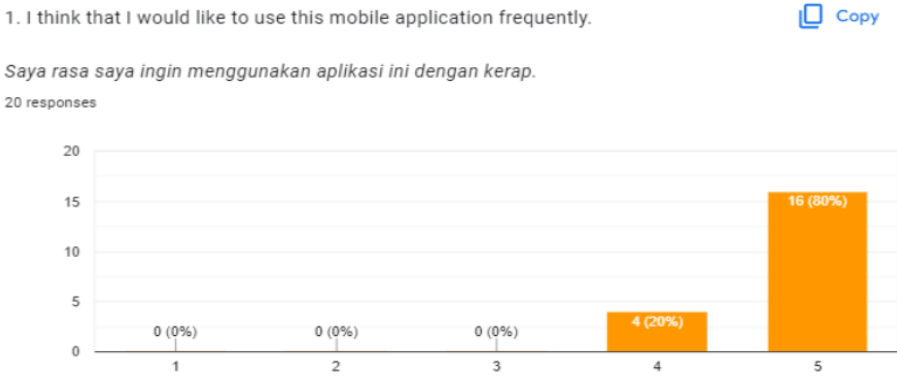


Figure 18: Percentage of user desire to use the application.

Figure 18 above describes that half (80%) of respondent strongly agree to use this mobile application frequently and the other half (20%) respondents answered agree.

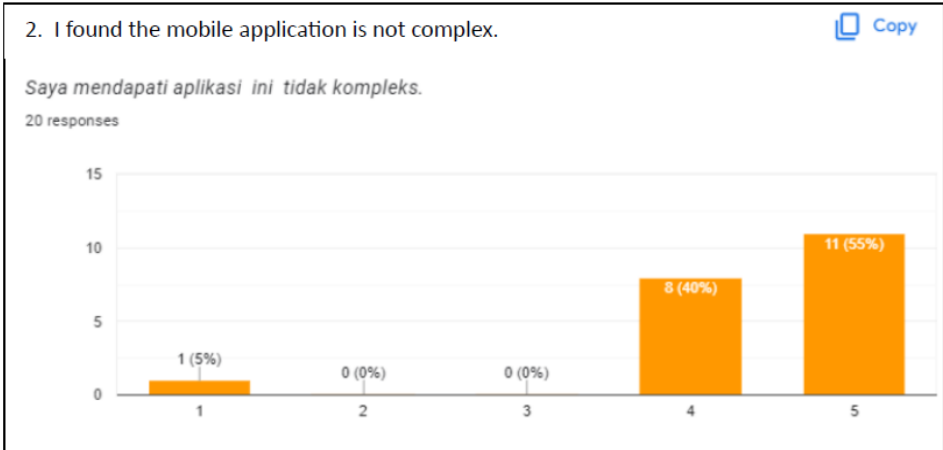


Figure 19: The percentage of respondent's opinion of application complexity

Figure 19 above determined that 55% of respondents strongly agree and 40% of respondents agree that the mobile application is not complex.

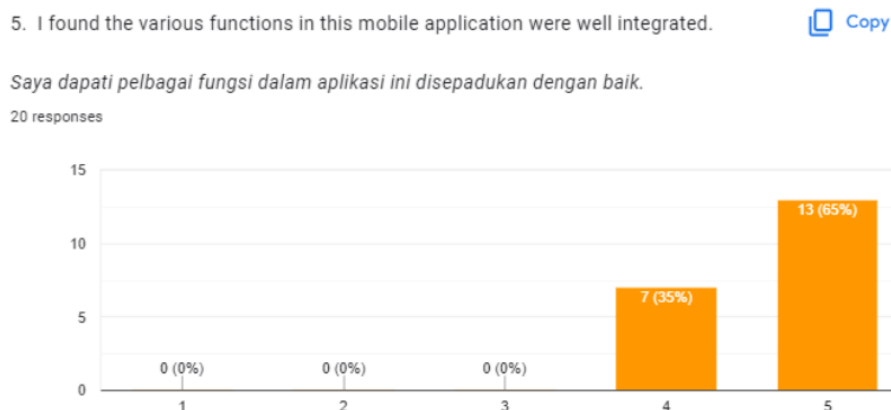


Figure 20: The percentage of respondent's opinion about the application integration

Figure 20 above shows that 65% of respondents strongly agree and 35% of respondents agree that the various functions in this mobile application were well integrated.

Based on the results, it can be affirmed that the application developed is beneficial in the field of Islamic education for ASD children. Parents and kindergarten teachers are interested in using this application as they could observe their children's performance. Additionally, it was found that this application is not complex making it suitable for ASD children learning Islamic education. ASD children need non-linear content to help them focus especially for abstract concepts like Islamic education. Images, sounds and quizzes could help ASD children to learn the lessons available. The application function is also well integrated which could improve user experience.

## 5 Conclusion

It is possible to implement religious teaching, especially to introduce Islam to kids with autism. Despite the complexity of these children's educational environments, a well-thought-out program is crucial to their success in school. It is important to emphasize that parents are not the only ones who have responsibility in this instance. With the aid of modern technology, it also requires the support of families, society, and educational authorities.

The most obvious way that technology is used in this current era is to help ASD children with communication. Numerous applications exist that assist those who are nonverbal in communicating their needs. Therefore, in this proposed project, the Islamic Educational Mobile Application for Autism Children, all the techniques and strategies learned from the existing application and comparable works will be utilized and developed. This project is expected to give various benefits to the autistic children's Islamic learning process. This mobile application will literally aid not only autistic children but also the parents and caretakers of these autistic children in guaranteeing a good growth process for these children. The mobile application can be used repeatedly by the users to be able to achieve their goals of knowing *Hijaiyah* letters, Pillars of Iman, Pillars of Islam and also practice Daily *doa* in life.

## Acknowledgements

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## Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

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