

The Development of Basic Wudhu Mobile Application for Johor Islamic School in Year 3 Pupils

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DOI: <https://doi.org/10.30880/mari.2022.03.01.013>

Received 30 September 2021; Accepted 20 November 2021; Available online 15 February 2022

Abstract: This paper will discuss the Islamic application that built for students in Year 3 in Sekolah Agama Johor about Wudhu which is under the subject of Ibadat. This research paper discusses on the subject of E-learning as a computer-based teaching tool, as it is currently increasingly often being utilized in all educational levels, especially during times when face to face interaction is not permissible. Teaching and learning in an e-learning environment differs from traditional classrooms learning environment and might bring new problems to teachers and students especially for those who are left behind in areas of technology. The purpose of this paper is to describe how the application works and highlight the e-learning concept through the application. The method that has been used for this apps development is the System Development Life Circle (SDLC) and the effectiveness result of the project can be seen through the questionnaires that we did on teachers and parents. We hope this application can help us improve the quality of our application and help more students to learn online.

Keywords: Islamic, Application, Ibadat, Year 3, E-learning

1. Introduction

Education is necessary for our lives since it aids in the acquisition of information, skills, values, morals, beliefs, and habits. We may learn from instructors, or we can educate ourselves. Many individuals take education for granted, although we all know that it develops confidence and helps to build the personality of a person. There is a huge difference between educated and uneducated person which are confidence, learning, growth in life and many more. Even if it is only basic education, we need to be educated and learn more information. It will raise public awareness, provide possibilities, and allow for self-advancement and progress. Even in Islam, it is necessary to continue studying if we have

the chance to do so that we do not fall behind the people around us. That is why even during the pandemic we still need to learn even if we have to undergo online classes. Moreover, as time goes by, we can see the purpose of our efforts in changing and updating education for our knowledge-based society [1].

From a future perspective, the quality of educational activities is crucial for the creation of a suitable environment that provides necessary educational services to students in terms of content, availability, speed, flexibility, timeliness and also reflect quality standards [1]. With the increase use of information and communication technology in education, new opportunities for better teaching, learning, and evaluation are emerging [2]. Regarding this, we made a research on why e-learning is important to us nowadays and what can e-learning do. It will be included about open distance learning, asynchronous and synchronous learning and more.

1.1 Concept and Definition of E-Learning

E-learning has been around for more than two decades [3] and the internet has become the most important resources for teaching and learning for both teachers and students [4]. When the internet began to change, so did the individuals who used it, and most crucially, e-learning pedagogy practices began to adapt. The term "learner-focused design" refers to current e-learning practices [3]. Technology-based e-learning includes the use of the internet and other significant technologies to create learning materials, train learners, and manage courses in an organization [4]. As IT becomes more advance and easier to use, it increasingly upgrades academic activities [5]. This makes it easier for teachers to use technology in their lessons because it is more accessible and feasible in this digital age. E-learning is a natural development of distance learning. It always uses current technology to plan and change the instructional framework to shape education [3]. This new learning environment cantered on electronic networks has enabled students in all institutions to receive individual support and have a more appropriate learning schedule for them, as well as to facilitate a higher level of interaction between them than traditional learning environments [4].

E-learning is referred to as the use of information and communication technology to provide access to online learning and teaching resources [4]. The definition of e-learning is related in different perspectives such as distributed learning, online distance learning and hybrid learning [4]. Moreover, e-learning is a computer-based educational tool or system that allows you to learn anywhere and anytime. Its concept has been known as "learning conductive via electronic media, typically on the internet" by Oxford [5]. This definition focuses on the concept of "interaction" as a crucial characteristic of e-learning and comes close to recognizing the critical role that teaching methods play in effective learning [5]. E-Learning is a type of interactive learning in which the learning materials is available online and the student's learning actions receive automatic feedback [3]. It is in electronic form and is saved on CD-ROMs or servers. Learners can access these materials directly from stand-alone computers or servers through networked devices. The materials are often designed to be entertaining and participatory, and the professors provide "virtual" support to the students [6]. Skype, Zoom, and Microsoft Teams are examples of free online video call solutions for meetings and training.

Concurrently, they help to facilitate communication between authentic and digital learning materials while also providing tailored learning possibilities [7]. It has the potential to assist deep learning and knowledge development in e-learning at all educational levels [8].

1.2 E-Learning in Malaysia

In Malaysia, they have been introduced to undergoing open and distance learning (ODL) programmed [6]. The existence of the internet in the early 1980s had given a new introduction of e-learning to ODL students in Malaysia [6]. Furthermore, students these days desire to receive information fast and make use of multi-modal or many communication methods to e-communicate with tutors and friends as well as obtain information [9]. The elementary school education system also demonstrates a trend and a definite direction toward online learning in schools. In this situation,

instructors and students already started to get more familiar with certain technologies and begin using smartphones and tablets for classroom teaching and learning [9].

1.3 The Effectiveness of E-Learning

Education is a process that incorporates skills, information acquisition, learning facilitation, values, attitudes, and habits. Therefore, there have been several factors that impact the effectiveness of e-learning in teaching and learning among teachers and students [10].

The first is the ICT capabilities that have been widely used and expanded around the world. Teaching and learning become more interesting because ICT provides interactivity. Having access to IT in Malaysia is no longer a problem because Malaysia has many network providers, making students have access to the internet. Moreover, students have no difficulty in using ICT as most of them now have laptops and personal computers [10]. It is a must for every student to have ICT skills because it may increase and build up their ICT development in e-learning. With the skills, it can improve their studies and learning styles.

Second, time management. Student time management relates to how they complete things efficiently. Proper time management among students will enable them to be more productive, creative, save money, avoid completing work in vain, and increase their chances of increasing academic success. According to previous studies, efficient time management is very important in dealing with the stresses of modern life while not feeling burdened by the traditional way of life. While using E-Learning, both teachers and students may work at their own pace and environment [10]. With e-learning, they have the choice to choose when and where they can study and teach. It is very convenient for people that are constantly busy, and they can manage their time carefully. For instance, it allows students whether to go slowly or quickly based on their understanding.

The third effectiveness of e-learning is resources. It is an online tool that is used among students and teachers for the virtual learning environment that makes it more comfortable for the delivery of educational content. As a result, the progress of ICT in multimedia resource-based learning has increased interest in the use of E-Learning for teaching and learning, particularly among students. E-Learning is used to convey, educate, or programmed information using electronic devices such as computers, mobile phones, iPad, tablets, and others [10].

1.4 Categories of E-Learning

E-learning is divided into two areas that allow students to study via the platform. It enables e-learners to use tools that are tailored to their unique interests [11]. Methods of delivering e-content in an online classroom, instructors, learners, interactive tools, forms of interaction, and a variety of other aspects in online learning modes are divided into two categories: synchronous and asynchronous e-learning.

Synchronous

This type of e-learning has grown in response to recognized demands throughout numerous ages, such as education. There is no physical encounter in the online educational environment [12]. It is an instructor-led platform that provides real-time teaching or learning process instantly (online) to students. Both the learners and instructors or tutors must be present during the lesson period [11]. In addition to that, synchronous also learns and teaches via an electronic method that occurs concurrently. Teacher-student and student-student contact are possible in synchronous voice or text chat rooms [13]. This enables teachers and students to communicate and share information or ideas in real-time [11]. Because of the presence of the teacher and classmates, synchronous sessions might result in high levels of desire to stay engaged in e-activities [13]. Additionally, using these tools also assists participants in

developing good social skills, which may lead to enhanced motivation and engagement, resulting in successful learning [14].

Table 1: Synchronous Communication Tools

Communication Tool	Usability	Limitation
Video conferencing	Allowing multiple people to meet face to face long distance	Network instability and time lag that may disrupt the conversation
Web conferencing	Allows for the exchange of presentations, papers, and application demonstrations.	A small-time gap between speaking and receiving a response may occur, disrupting the natural flow of a discussion.
Whiteboarding	Idea demonstration and co-development	Based on bandwidth, and sometimes successful with audio conferencing

Asynchronous

Asynchronous e-learning is a self-directed learning process that may be completed with or without the presence of teachers or students. Coursework and other learning messages are distributed via the internet or email. Students can use the web to download course materials and upload any pending tasks. This platform provides students with the freedom of time and schedules while also improving their cognitive thinking capacity [11]. This strategy encourages learning by combining self-learning with asynchronous interaction, and this can be used to aid learning in traditional on-campus or regular education, distance education, and continuing education. Asynchronous e-learning networks are a combination of student networks and electronic networks through which they communicate [12]. While there are many students in online classes, this form of communication is very beneficial. However, students may tend to be disorganized in participation and sometimes students who are not well-disciplined may tend to copy-paste some assignments from the internet, thus making them responsible for copying [14].

Table 2: Asynchronous Table Tools

Communication Tool	Usability	Limitation
Discussion Forum	Collaboration and idea exchange might take place over a certain length of time.	It is possible that other people's opinions will be misinterpreted as a result of this. It will also take a while to receive feedback.
Sending e-mails	One-to-one or one-to-many distribution of course materials and communication privacy	It is difficult to receive a quick response to emails, especially when courses are big.
Using social media platform	<ul style="list-style-type: none"> • Message distribution, such as crucial announcements • Group chat may be used as a discussion forum. 	<ul style="list-style-type: none"> • Controlling the degree of involvement is difficult. • Because messages in the group chat cannot be erased after a long period of time, bad or unwanted involvement cannot be avoided.

1.4.1 Advantages and Disadvantages of E-Learning

As the world moves toward the digital era and all educational levels want to optimize the use of technology in education, one must evaluate both the benefits and drawbacks of doing so. Although there

have been so many improvements in e-learning systems, there are still disadvantages of it to the students and teachers.

An organized e-learning system combined with highly motivated students can produce significant achievement in a short period of time. The major advantages of e-learning have been listed below:

- i. Students can access any e-learning materials without any limit through their phone. They do not have to be physically present in the classroom to learn and save the materials [15].
- ii. Adoption of e-learning gives institutions as well as their students or learners with a great deal of flexibility in terms of time and location [4].
- iii. Most students find that e-learning is a cost-effective method to learn since they may choose from a wide choice of subjects and change their learning to their own requirements [15].
- iv. It is able to facilitate communication between students through the use of discussion forums. Through this, e-learning aids in removing barriers to participation, such as the fear of talking to other students. E-learning encourages students to interact with each other while exchanging and respecting various points of view [4].

Nonetheless, e-learning could be the main source of misinformation, poorly guided training or bad knowledge meaning it could bring disadvantages to us too. Platforms for online learning, there are also certain aspects that might be regarded as challenges in the learning process of students. The disadvantages of e-learning are listed below:

- i. Online students are more likely to become sidetracked, lose attention, or miss deadlines. E-learning is reliant on technology, such as the internet and computers, to which students may not have access, and interruptions or other system faults may occur during learning [16].
- ii. The flexibility to organize how they study and the amount of time spent on learning can sometimes lead to diminished motivation, and a lack of physical connection and the presence of friends can cause students to feel secluded [16].
- iii. Because there are several accessible learning systems, study materials created with one system may not be compatible with another system. Next, access to websites may not be free everywhere, as some countries limit the number of websites that may be viewed [15].
- iv. Online learning is an excellent alternative learning technique for students and lecturers; however, there are some specific difficulties to consider, such as limited internet connectivity. According to reports, about 52 percent of students in Sabah, Malaysia, do not have access to the internet due to poor infrastructure [17].

1.5 Teachers and Students Perceptions Towards E-Learning

There are several reasons for its e-learning acceptance; some of which are very relevant in the case of students are simplicity of use, flexibility, and better control over the environment. While there are many benefits, e-learning has several drawbacks, including social isolation, lack of student-teacher relationships, and difficulty in connecting among others [18]. This is why it is important to understand student's acceptance of e-learning as part of their learning style, as well as its advantages, so that lecturers and policy makers can make improvements in the future [19]. However, as a result of the pandemic, many institutions and universities across the country are now turning to e-learning [18].

The rapid growth of technology and the widespread availability of the internet in various places have prompted many education systems to start incorporating e-learning in their education systems. They are able to increase their knowledge by the same amount as conventional learning through e-learning. In addition, video streaming is one of the recently created technologies that has aided in the

transformation of e-learning to its current stage. Using video streaming, instructors can record their own video and distribute their instructional materials to students online through the internet. This approach is said to be beneficial to the students as the teacher will explain the procedure step by step and in a more interesting way to help the students understand a particular subject. Because students understand what they will receive at the end of the program, students view e-learning materials as one of the most important aspects of e-learning [19]. However, they believe that e-learning is not effective in improving their way of understanding and social capabilities compared to face-to-face learning. They are less involved in e-learning than in regular classrooms. One of the reasons is the lack of interactive approaches in the development of e-learning courses [20].

For teachers' perception of e-learning is that online learning is still a relatively new method of education in Malaysia. That's why, in order to enable an effective online learning environment, teachers' initial insights into online learning are crucial; the benefits and barriers to implementation must be acknowledged. However, as time goes on and they can adapt quickly, they find e-learning very easy because teaching their students can be done anytime and from any location, online materials can be updated, and students can see the changes with immediately; when students have access to materials on the internet, instructors can more easily direct them to appropriate information based on their needs, online learning systems can be used to determine student needs and set appropriate materials to choose from [21].

1.6 Overview of Literature

What we can conclude from this research is that the use of digital technology for teaching and learning is referred to as e-learning. It uses state-of-the-art technology to allow students to learn anytime and anywhere they choose. This facilitates communication and strengthens relationships that support learning. The role of e-learning has brought so much impact to students and teachers, whether it be advantages or disadvantages. It also brings benefits to teachers as they have so many flexibilities in teaching their students. However, online learning and teaching in Malaysia needed to be improved, particularly in the quality of interaction and instruction provided to students during the learning.

2. Materials and Methods

The following is our description of the materials or software and methods used to develop this application. In the development of this application, we focus on the content and multimedia that we use to produce applications that can attract the attention of users.

2.1 Thinkable

Thinkable is the platform where anyone can build their mobile applications. The feature is available for both IOS and Android. Thinkable is a free-to-use website that allows all features to be used in developing a mobile application. It's an easy website and does not require a mobile phone to test your application. Apart from that, Thinkable uses a lot of third-party websites such as OneSignal and Firebase for push notification features. There is an option called LocalDb to store anything such as videos, images and also questions for a quiz application. This feature helps in storing data and saving more space and total screen for the application. With Thinkable, you could download the project and install it on your phone once they sent it to your email.

2.2 Lottie Animation

A Lottie is a JSON-based animation file format that allows designers to distribute animations on any platform just like static assets. They are tiny files that can be scaled up or down without pixilation and operate on any device. Using the Lottie Animation extension in Adobe After Effects, we can directly export the animation from Adobe After Effects into a JSON file. We can use the animation

overview in Thinkable and use Lottie's Animation component. It allows adding animations as simple as adding pictures.

2.3 Adobe Photoshop

Adobe Photoshop is software used to edit the images used in this project as one of the contents of the application. This software is more used to remove background images that do not want to be used. With this software, we can produce images more neatly

2.4 Adobe After Effects

Adobe After Effects is software for editing effects on video. We use this software to create animations by making movements on images that have been edited in photoshop. This animation is multimedia that is available in the project that aims to attract the attention of students and make users use this application for a longer time.

2.5 Adobe Media Encoder

Adobe Media Encoder is used to create multimedia content for the web and other platforms. This gives you the ability to convert material in a variety of ways, including altering the format. Media Encoder compresses media files, making them smaller in size. We export our animation file from JSON file to MP4 using this software.

2.6 Waterfall model

The waterfall model as per shown in **Figure 1** is one of the methods available in SDLC. In this model, there are several phases that we implemented to produce this project. Among the phases are requirement analysis, system design, implementation, testing, deployment and maintenance. We implement each phase in chronological order so that it is easy to make this project a success. In the first phase, we study the e-learning applications that already exist to prevent us from creating projects similar to other existing applications. After that, we run the next phase.

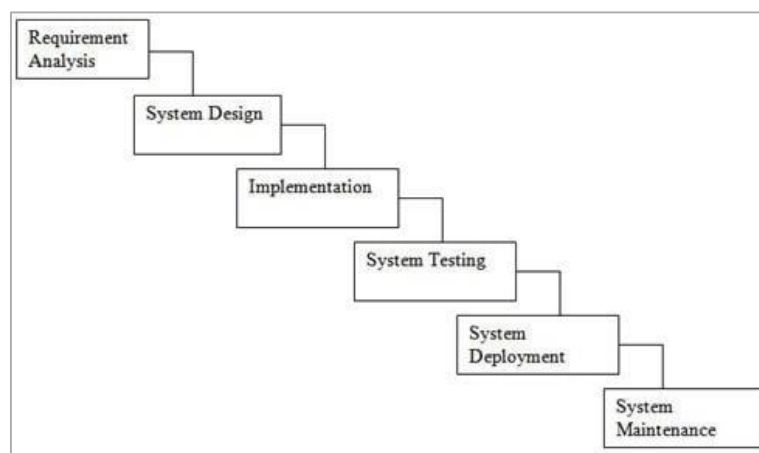


Figure 1: Waterfall model

3. Phases of the Waterfall Model

3.1 Requirement Gathering

In this phase, we have researched the Play Store, Apple Store and on several websites about the less created apps at the moment. Most of the applications developed are applicable national school-related subjects in school are often preferred as Bahasa Melayu, English, Mathematics and Science.

3.2 System Design

In this phase, we have sketched and designed the interface for each screen to come out with some basic storyboards to somehow shows the application flows from one screen to the other. This is necessary in helping us to identify how this application works while this application is in use, especially from user point of view or perspectives. This phase will also determine the level of attractiveness to consumers, and judge whether the apps is interesting enough to attract year three students at first glance. The theme we use for this application is appropriate for the age of the users of this application, namely students who are 9 years old. This design phase can also help us to identify the weaknesses that will be presented in the application. In addition, this design can also help users in understanding the system flows for ease of use.

Figure 2 (a) shown is the main screen of the application that will be shown to the user, where the user will see two imitations of Sekolah Agama Kerajaan Johor students interacting with each other. These two characters were created with the intention of getting some connection to the user with the systems, in a way that they can actually identified themselves as one of the characters presented. The character is of one boy and one girl. Application users may choose to watch the animation (landing page) provided or continue to use the application without watching the landing page by clicking on the *Masuk* button. This kind of scenario (landing page) is rather common in apps or games application to initiate some kind of interaction between the user and the apps to make sure that it is not a one-sided communication between the apps and the user.

As shown in **Figure 2 (b)**, the screen will display the Reference Notes button and Exercises Module button. The Reference Notes will consist of four parts where the user will be given the options of which topics that they want to explore as shown in **Figure 2 (c)**. For Exercises Module, the students can do the exercises given like **Figure 2 (c)**.

This is where the students can pick any topics they want to learn. After clicking the button Doa After Ablution as shown in **Figure 2 (b)**, the screen will display samples of doa after taking ablution. They can click the button Continue to see more of the doa. The doa will be shown in Arabic fonts together with their meaning to further enhanced the student understanding as per shown in **Figure 3**.

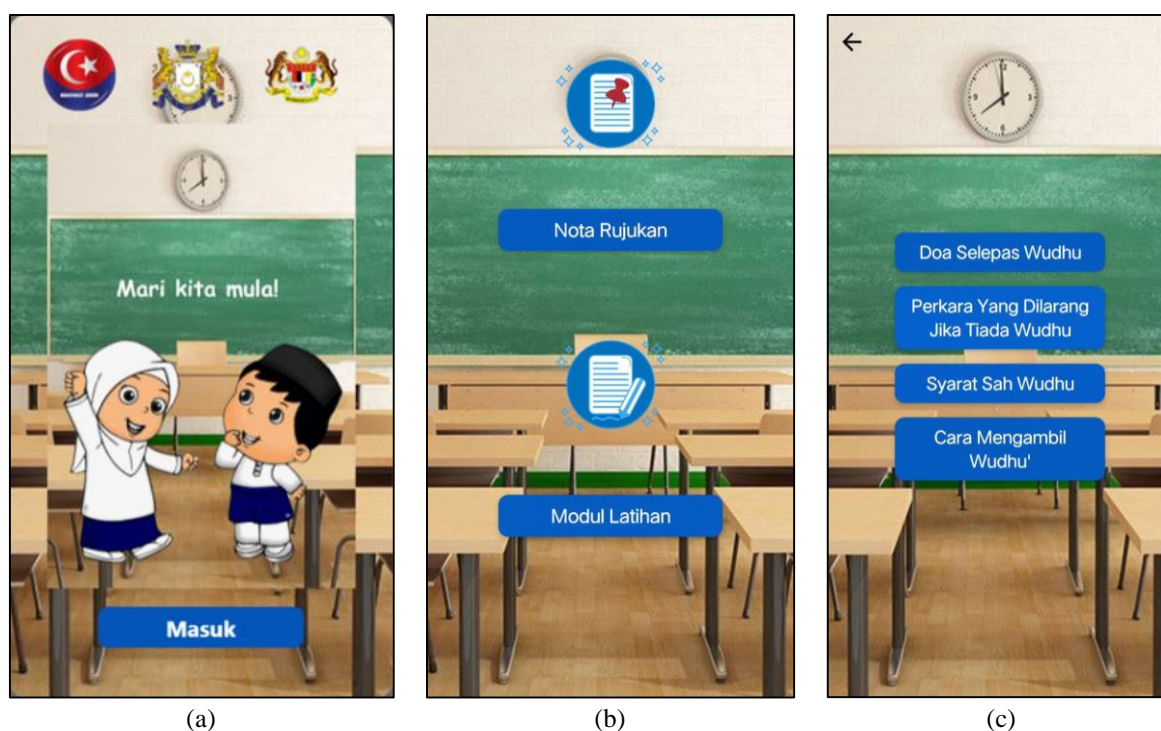


Figure 2: Interface design for (a) the main screen, (b) notes and exercises, and (c) topic selection

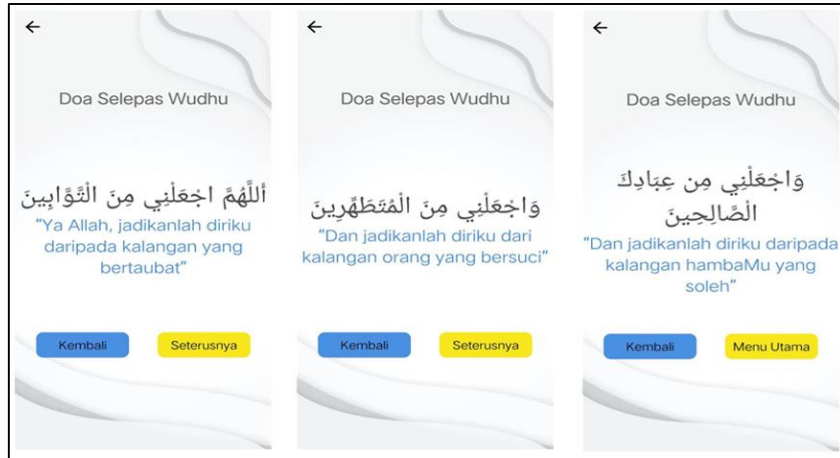


Figure 3: Sample doa after abluion

Screens as shown in **Figure 4** will be prompted to the user when they slick the topic *Perkara yang Di Larang ketika tiada Wudu'* (things that are forbidden to do without abluion).

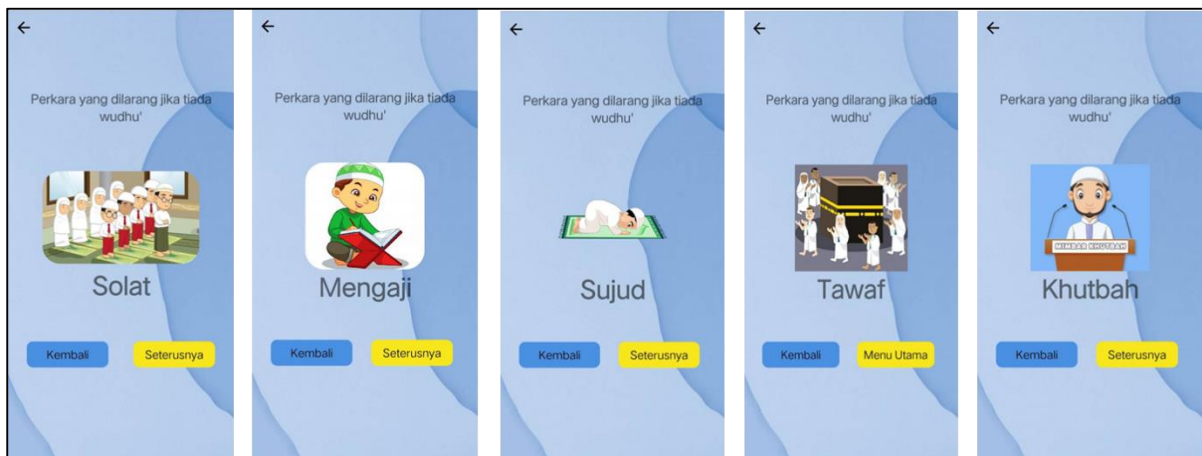


Figure 4: Things that are forbidden to do without abluion

Figure 5 will be shown when user choose or click the button *Syarat Sah Wudu*. This section will list out the fundamentals of abluion.

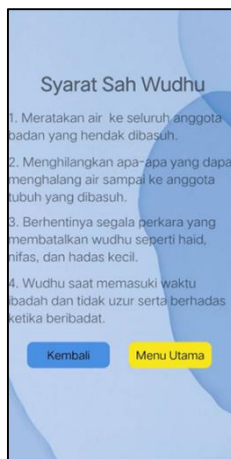


Figure 5: Legal requirements of abluion

The third button in **Figure 2 (c)** will display the Legal Requirements of Ablution. Before taking an ablution, the students must know what makes the ablution legal so that their prayers will be accepted by Allah SWT.

The last topic of this application is How to Take Ablution in **Figure 2 (c)**. This topic will teach you the intention of ablution before taking one and after that, it will show videos step by step on how to take ablution properly like shown in **Figure 6**. This is to show the students how it needs to be done. Lastly, after they are done, it will display doa after ablution. It is easy and efficient as the students can easily understand both Arabic and Bahasa Melayu.

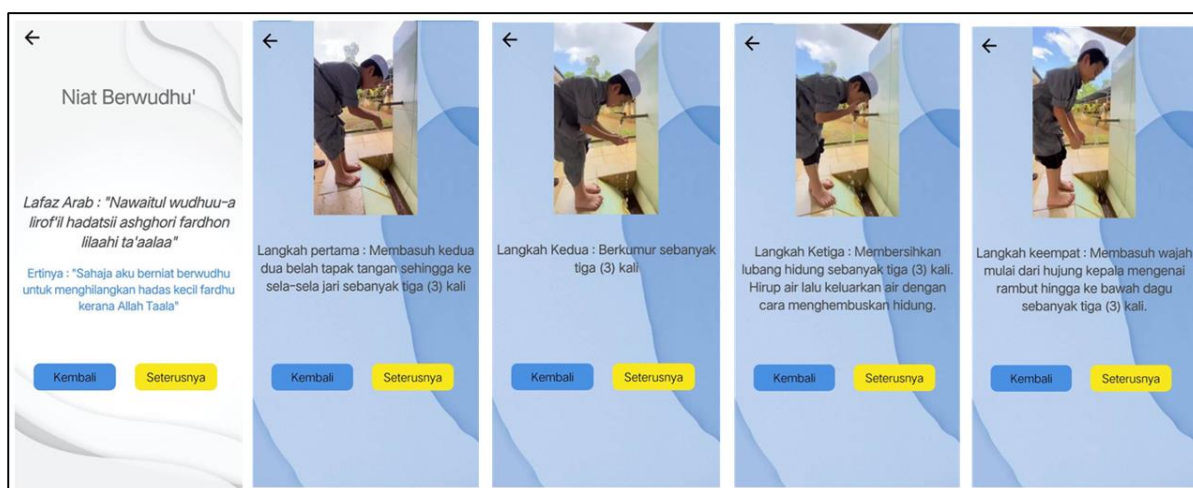


Figure 6: How to take ablution

For the Exercises Module button displayed in **Figure 2 (b)**, once they click on it, there are 16 exercises for students to answer as shown in **Figure 7**. After they have done answering, it will show the total marks and below the marks, the students are given the options whether they want to answer the quiz again, go to the main menu or refer to the notes. The purpose of this is to strengthen their skills when answering.

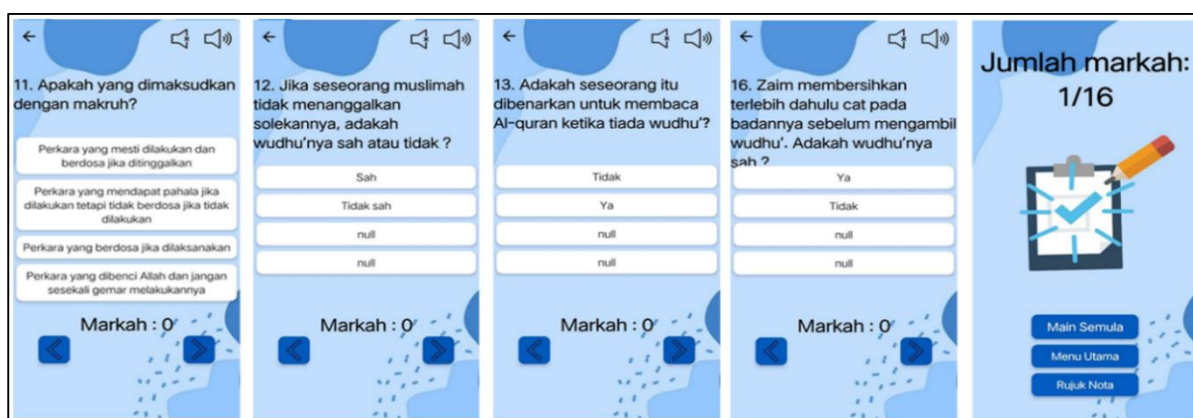


Figure 7: Sample quizzes

4. Results and Discussion

The results and discussion section present the data obtained as a result of the study. The purpose of this survey is to obtain data more accurately, quickly and securely. The questionnaire includes several parts, namely the respondents' personal information, opinions about the application developed and the respondents' views on this application whether it can help and facilitate students in reviewing the subject of Ibadat or not. The Islamic application that we developed for the Year 3 students helped them gain more knowledge despite the situation we are in right now which is Covid-19. It really helps both the

teachers and students in somehow understanding the topics that are being thought through an online medium. Though the apps is not intended to replace the traditional teaching method, in a way it can helps assists the students and teachers in proceeding with teaching and learning process during times when face to face classes is not permissible.

4.1 Results

Table 3 are the results that we obtained from the Google Form survey that was conducted during the control movement order.

Table 3: Results from respondents

Questions	Options	
	Yes	No
1. Is a learning application for religious school pupils important to you?	92.3%	7.7%
2. Do you think that the multimedia and animation used will be able to attract the attention of students?	100%	0%
3. In your opinion, is the application easy to learn and understand?	92.3%	7.7%
4. Are the questions given are appropriate to the student's level of thinking?	100%	0%

Figure 8 shows the chart from the respondents whether they agree or not about developing the application. From the result that has been obtained from the respondent's, we can see that almost half of them agreed about the development of our application and how it helps the students.

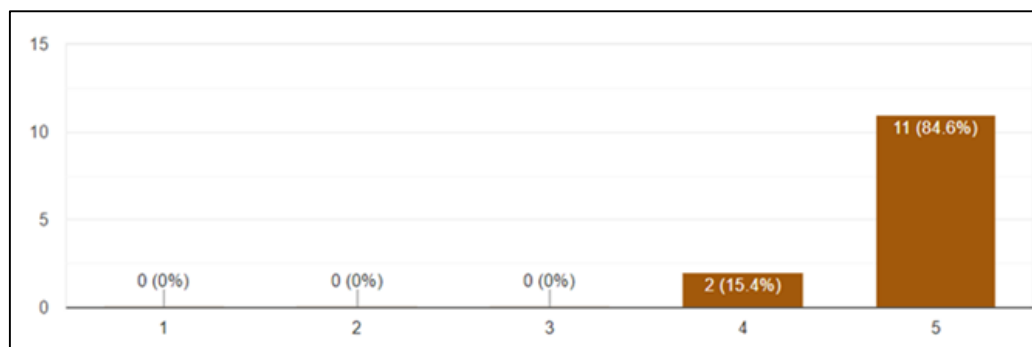


Figure 8: Chart of respondent's agreement

4.2 Discussions

From the survey conducted through distribution of questionnaires to parents and teachers, it indicates that religious application is needed for their kids and students as there are not many that have been developed nowadays, especially those that are related to subjects that being thought in Sekolah Agama Johor. Through this application, users make it students, parents or teachers could easily understand religious topics especially in terms of the dos dan don'ts and learn well because of how convenient this apps is. The use of animation in this application attracts helps in attracting and engaging the attention in and during the learning process.

From this research activities, what we can conclude is that through this apps students have the opportunity to learn and interact with their teachers asynchronously wherever they choose, thanks to these approaches and flexible learning environments. This article is for the awareness and solidarity of our educational system in continuing the educational process despite the difficulties that currently exist. They can fully utilize this application as a one of the learning methods being used. We hope that in the future, we can create more syllabus, topics and exercises in our apps and broadening the scope of applications to make it more robust.

Acknowledgement

This research was made possible because of the journals that have been found on Google Scholar. We would also like to thank the Centre for Diploma Studies, Information Technology, University Tun Hussein Onn Malaysia for their support.

References

- [1] M. Misut and K. Pribilova, "Measuring of Quality in the Context of e-Learning," *Procedia - Soc. Behav. Sci.*, vol. 177, no. July 2014, pp. 312–319, 2015, doi: 10.1016/j.sbspro.2015.02.347.
- [2] I. Gil-Jaurena and S. K. Softic, "Aligning learning outcomes and assessment methods: a web tool for e-learning courses," 2011, doi: 10.1186/s41239-016-0016-z.
- [3] Z. Bezhovski and S. Poorani, "Information and Knowledge Management The Evolution of E-Learning and New Trends," vol. 6, no. 3, 2016, Accessed: Jun. 15, 2021. [Online]. Available: www.iiste.org.
- [4] D. G. Perrin, E. Perrin, and B. Muirhead Senior Editor Muhammad Betz, "INTERNATIONAL JOURNAL OF INSTRUCTIONAL TECHNOLOGY DISTANCE LEARNING Volume 12 Number 1 Editorial Board Editor-in-Chief," 2015.
- [5] A.-M. Tîrziu and C. Vrabie, "Education 2.0: E-Learning Methods," *Procedia - Soc. Behav. Sci.*, vol. 186, pp. 376–380, May 2015, doi: 10.1016/j.sbspro.2015.04.213.
- [6] A. Anuwar, "Issues & Challenges in Implementing E-Learning in," *Oum*, pp. 1–9, 1111, [Online]. Available: <https://core.ac.uk/download/pdf/298086577.pdf>.
- [7] J. Kee-Ming Sia and A. Abbas Adamu, "Facing the unknown: pandemic and higher education in Malaysia," doi: 10.1108/AEDS-05-2020-0114.
- [8] E. Mnkandla and A. Minnaar, "The Use of Social Media in E-Learning: A Metasynthesis," *Int. Rev. Res. Open Distrib. Learn.*, vol. 18, no. 5, p. 227, 2017, doi: 10.19173/irrodl.v18i5.3014.
- [9] R. Parthasarathy, I. Perumal, A. Abdullah, N. Jayabalan, M. Subramaniam, and G. Perumal, "A Paradigm Shift in Online Learning Practices among Primary School Teachers in Malaysia: Adaptive Learning System Framework," *Int. J. Manag.*, vol. 11, no. 10, pp. 410–418, 2020, doi: 10.34218/IJM.11.10.2020.040.
- [10] R. C. Aziz *et al.*, "Teaching and learning in higher education: E-learning as a tool," *Int. J. Innov. Technol. Explor. Eng.*, vol. 9, no. 1, pp. 458–463, 2019, doi: 10.35940/ijitee.A4188.119119.
- [11] A. Mohammed, S. Kumar, B. Maina, A. Shuaibu, and B. M. Saleh, "E-Learning: A Tool for Enhancing Teaching and Learning in Educational Institutes Framework for Developing MIS and E-learning Integration in Education System View project E-Learning: A Tool for Enhancing Teaching and Learning in Educational Institutes," 2017. Accessed: Jun. 16, 2021. [Online]. Available: <https://www.researchgate.net/publication/321304469>.
- [12] M. M. Shahabadi and M. Uplane, "Synchronous and Asynchronous e-learning Styles and Academic Performance of e-learners," *Procedia - Soc. Behav. Sci.*, vol. 176, pp. 129–138, 2015, doi: 10.1016/j.sbspro.2015.01.453.
- [13] A. Perveen, "Synchronous and Asynchronous E-Language Learning: A Case Study of Virtual University of Pakistan," *Open Prax.*, vol. 8, no. 1, pp. 21–39, doi: 10.5944/openpraxis.8.1.212.
- [14] F. P. Lim, "An Analysis of Synchronous and Asynchronous Communication Tools in e-

- Learning,” no. January, pp. 230–234, 2017, doi: 10.14257/astl.2017.143.46.
- [15] P. Srivastava, “Advantages & Disadvantages of E-Education & E-Learning,” vol. 2, no. 1999, 2018.
- [16] C. Coman, L. G. Țiru, L. Meseșan-Schmitz, C. Stanciu, and M. C. Bularca, “Online teaching and learning in higher education during the coronavirus pandemic: Students’ perspective,” *Sustain.*, vol. 12, no. 24, pp. 1–22, 2020, doi: 10.3390/su122410367.
- [17] M. Selvanathan, N. Atikah, M. Hussin, N. Alyani, and N. Azazi, “Students learning experiences during COVID-19: Work from home period in Malaysian Higher Learning Institutions,” doi: 10.1177/0144739420977900.
- [18] S. Abbasi, T. Ayoob, A. Malik, and S. I. Memon, “Perceptions of students regarding e-learning during covid-19 at a private medical college,” *Pakistan J. Med. Sci.*, vol. 36, no. COVID19-S4, pp. S57–S61, 2020, doi: 10.12669/pjms.36.COVID19-S4.2766.
- [19] F. A. Azhari and L. C. Ming, “Review of e-learning Practice at the Tertiary Education level in Malaysia,” *Indian J. Pharm. Educ. Res.*, vol. 49, no. 4, pp. 248–257, 2015, doi: 10.5530/ijper.49.4.2.
- [20] M. Bączek, M. Zagańczyk-Bączek, M. Szpringer, A. Jaroszyński, and B. Woźakowska-Kapłon, “Students’ perception of online learning during the COVID-19 pandemic: A survey study of Polish medical students,” *Medicine (Baltimore)*, vol. 100, no. 7, p. e24821, Feb. 2021, doi: 10.1097/MD.00000000000024821.
- [21] R. P. Rahayu and Y. Wirza, “Teachers’ Perception of Online Learning during Pandemic Covid-19,” *J. Penelit. Pendidik.*, vol. 20, no. 3, pp. 392–406, 2020, doi: 10.17509/jpp.v20i3.29226.