

Islamic Philanthropy-Based Fintech: Design of Stock *Waqf* Simulation Software

Andi Harpepen^{1*}, Herlina Yustati²

^{1,2}Universitas Islam Negeri Fatmawati Sukarno Bengkulu, Indonesia

Abstract

Waqf, as a form of Islamic philanthropy, has strong potential in Indonesia. Indonesia's predominantly Muslim population and the generous character of the Muslim community offer great opportunities for the development of waqf. One of the latest developments in waqf is stock waqf, which operates in the Islamic capital market as a product of Islamic philanthropy. Among university students, stock waqf literacy is still low, although the current generation is very familiar with digital technology. Therefore, the development of a stock waqf application as an educational tool can be a solution to improve students' understanding of stock waqf. The purpose of this research is to develop a stock waqf simulation application through fintech technology to improve literacy among students. The results of the development of the stock waqf simulation application have gone through various stages, including needs analysis, design, implementation, and testing. The test results show that this software fulfils the needs well, with the validity of the test reaching 100%. This indicates that the stock waqf simulation application has been successfully created and can be used to provide an understanding of stock waqf simulation.

Keywords: *waqf, stock waqf, philanthropy, fintech*

Abstrak

Waqf, sebagai bentuk filantropi Islam, memiliki potensi yang besar di Indonesia. Populasi Muslim yang mayoritas di Indonesia dan sifat dermawan komunitas Muslim menawarkan peluang besar untuk pengembangan waqf. Salah satu perkembangan terbaru dalam waqf adalah waqf saham, yang beroperasi di pasar modal Islam sebagai produk filantropi Islam. Di kalangan mahasiswa, literasi waqf saham masih rendah, meskipun generasi saat ini sangat familiar dengan teknologi digital. Oleh karena itu, pengembangan aplikasi waqf saham sebagai alat pendidikan dapat menjadi solusi untuk meningkatkan pemahaman mahasiswa tentang waqf saham. Tujuan penelitian ini adalah mengembangkan aplikasi simulasi waqf saham melalui teknologi fintech untuk meningkatkan literasi di kalangan mahasiswa. Hasil pengembangan aplikasi simulasi waqf saham telah melalui berbagai tahap, termasuk analisis kebutuhan, desain, implementasi, dan pengujian. Hasil pengujian menunjukkan bahwa perangkat lunak ini memenuhi kebutuhan dengan baik, dengan validitas pengujian mencapai 100%. Hal ini menunjukkan bahwa aplikasi simulasi waqf saham telah berhasil dikembangkan dan dapat digunakan untuk memberikan pemahaman tentang simulasi waqf saham.

Kata Kunci: wakaf, wakaf saham, filantropi, teknologi keuangan

INTRODUCTION

The first strong potential of *waqf* in Indonesia is due to Indonesia's Muslim-majority population, known as generous Muslims. The second potential is the development of *waqf*

¹ Corresponding author. Andi.harpepen@mail.uinfasbengkulu.ac.id

regulations where *waqf* has its own law, Law No.41/2004 on *Waqf*. The third potential in *waqf* is the variety of *waqf* found in Indonesia, such as land *waqf*, cash *waqf*, and several studies have examined the potential of these varieties of *waqf*.

The latest variety of *waqf* is stock *waqf*, which operates in the Islamic capital market as one of the products of Islamic philanthropy. At the Capital Market Summit & Expo held on 26 April 2019 in Surabaya, the Indonesia Stock Exchange introduced the stock *waqf* programme. Share *waqf* can provide great potential in the development of *waqf* in Indonesia, due to the increasing number of investors every year.

Data from the Indonesian Central Securities Depository (KSEI) as of February 2022 shows a significant increase in the number of investors in Indonesia, as illustrated in Figure 1.

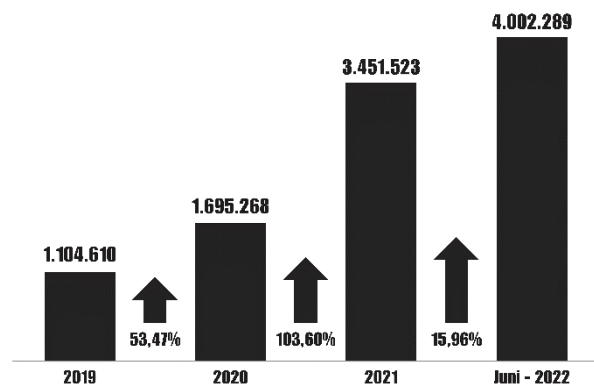


Figure 1. Stock Investor Data

If based on the age range of investors in Indonesia, 59.72% of the number of investors have an age range of ≤ 30 years, 21.92% are 31-40 years old, 10.53% are 41-50 years old, 5.08% are 51-60 years old and 2.75% are >60 years old. The increase in the number of investors from 2021 to 2022 is 15.96%. At the end of 2021, there were 3,451,513 people who had become investors and increased until at the end of June 2022 there were 4,002,289 investors. The increase in the number is of course one of the proofs of the proximity of the community to financial technology (fintech). The next potential of *waqf* is that the utilization of technology has also been carried out by the Directorate of Zakat Empowerment and *waqf*, as illustrated in Figure 2.

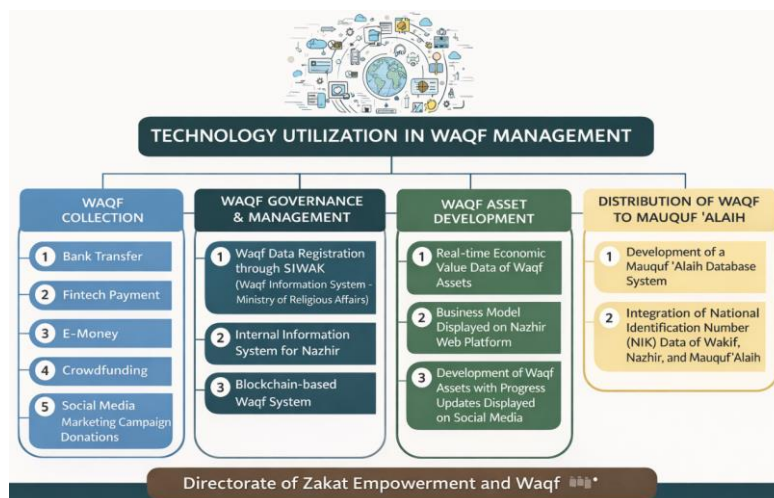


Figure 2. Technology Utilization in *Waqf* Management

Further *waqf* potential through the use of technology has also been carried out by the Directorate of Zakat Empowerment and *waqf*, namely through *waqf* collection can be done by

bank transfer, fintech payment, E-money, crowdfunding, marketing, campaigns and donations through social media. In governance, *waqf* management utilises technology with the SIWAK application which functions as a *waqf* database, an internal information system for *nazhir* and blockchain *waqf*. The development of *waqf* assets is carried out through real time data on the economic value of *waqf* assets, business patterns appearing on the *nazhir* business web and the development of *waqf* assets whose progress appears in the media. Meanwhile, the distribution of *waqf* for *mauquf alaih* is carried out by creating a *mauquf alaih* database system and integrating the NIK data of wakif, *nazhir* and *mauquf alaih*.

However, these potentials are not accompanied by an increase in *waqf* literacy in Indonesia. Meanwhile, literacy is one of the prioritised issues in improving *waqf* development (Arief et al., 2021). Several studies have shown that *waqf* literacy remains relatively low or moderate. (Muthiah et al., 2021), (Machmud & Suryaningsih, 2020), and (Rahmah Ghanny & Fatwa, 2021) report that zakat and *waqf* literacy levels in Indonesia are still limited. (Afandi et al., 2022) found that *waqf* literacy is at a moderate level, while (Napitupulu et al., 2021) reported a high literacy level in specific contexts. However, these studies mainly focus on *waqf* and cash *waqf*, not on stock *waqf*.

Table 1. *Waqf* Literacy Index Score in Indonesia

No	Dimensions/variables	Score	Category
1	Basic understanding of <i>waqf</i>	57.67	Low
2	Advanced understanding of <i>waqf</i>	37.97	Low
3	Zakat Literacy index	50.48	Low

Source: Indonesian *Waqf* Board

The *waqf* literacy index was also carried out by several researchers, namely Muthiah, et al (Muthiah et al., 2021), Aqidatul Izzah Machmud, et al (Machmud & Suryaningsih, 2020), Astika Rahmah Ghanny and Nur Fatwa (Rahmah Ghanny & Fatwa, 2021) the results of these three studies show that the level of zakat literacy is still low, Muhammad Nur Afif Afandi (Afandi; et al., 2022) the results show that the level of *waqf* literacy is in the middle category with a literacy index of 76.89%, and Rodame Monitorir Napitupulu's research (Napitupulu et al., 2021) shows the result that the level of *waqf* literacy is high. This literacy index research was conducted on *waqf* or cash *waqf*. And this literacy index has not been carried out on *waqf* shares.

Based on initial observations of students of the faculty of economics and Islamic business, only 2 out of 10 students are familiar with stock *waqf*. Stock *Waqf* literacy can be introduced through the use of digital technology to students, because this generation is a generation that is close to digital technology. The development of the stock *waqf* application can be used as a strategy, solution and effort to support, help introduce and increase understanding to students as stock *waqf nazhirs* or as stock *waqf* endowers, and as support for the Zakat and *Waqf* Management study programme.

Currently, the number of investors in Bengkulu Province reaches 41,000 people (Ni'amillah Sari, BEI KP Bengkulu), and as many as 2500 people have registered their share accounts through FAC Sekuritas (Yeni Sartika, FAC Bengkulu). The number of FAC Sekuritas investors in Bengkulu Province is 2500 investors, consisting of various groups including UIN Fatmawati Sukarno Bengkulu students consisting of 1800 people (Yeni Sartika, FAC Bengkulu). The increase in the number of investors is not proportional to the increase in the number of investors who utilise fintech services in the field of crowdfunding philanthropy through this Islamic capital market product.

The realm of education is an area that carries out the process of transforming knowledge with various strategies and ways of teaching. The education system when the internet did not exist was carried out by modeling conventional lectures. Media and technology developed rapidly in the

internet era. As a means of learning, these two things are used for educational strategies and models or better known as learning media. So, it is seen as the importance of simulation software to increase student literacy in the field of fintech, especially fintech *waqf* shares, and facilitate educators in transferring knowledge.

The development of fintech in the field of Islamic economics has been widely carried out. However, these fintech developments are mostly implemented by financial institutions and are designed for operational purposes, rather than as educational simulation tools in higher education settings, for example the development of *mudharabah* financing information systems (Rusdi et al., 2021), *Murabahah* Financing Information System, 2021), Web-based *Murabahah* Financing Information System (Rahardi & Azima, 2019), Web-based Cash *waqf* Information system (Pramesti & Persada, 2022), *Waqf* Asset Management Geographic Information System (Fahmi, Amiq & Sugiarto, 2012), Integrated Zakat Infaq Sedekah Information System (Syaifullah & Idrus, 2019), a system that uses Google Maps and is designed to bring together *muzakki* and *mustahik* (Sahrial, 2018), and others. This fintech development is carried out at certain financial institutions rather than universities with the aim of increasing literacy through the development of fintech simulations.

The Stock *Waqf* Platform or stock *waqf* service by utilising fintech has also been provided by 6 Securities Companies out of 14 AB SOTS Securities Companies, namely: MNC Sekuritas, BNI Sekuritas, Indopremier Sekuritas, Philip Sekuritas, Henan Putihrai Sekuritas, Panin Sekuritas. However, the fintech that has been provided is provided by securities for *wakifs*, there is no fintech that supports the improvement of stock *waqf* literacy for students in the form of simulations.

Despite the growing body of studies on *waqf* development, Islamic philanthropy-based fintech, and *waqf* literacy in Indonesia, existing research has predominantly focused on cash *waqf*, asset *waqf*, and operational fintech platforms implemented by financial institutions. Studies that specifically address stock *waqf* literacy, particularly through educational simulation-based applications in higher education contexts, remain very limited. Moreover, existing stock *waqf* platforms provided by securities companies are designed for real transactions and do not function as learning media that allow students to understand stock *waqf* mechanisms in a safe, experiential, and structured manner. This condition indicates a clear research gap, namely the absence of a fintech-based simulation model that integrates Islamic philanthropy, capital market instruments, and learning-oriented digital applications. Therefore, this study introduces WASAM, a stock *waqf* simulation application designed as an educational tool to enhance students' literacy and practical understanding of stock *waqf*, which constitutes the main novelty of this research.

Increasing literacy is very important for students, increasing literacy in the field of stock *waqf* through fintech software simulations not only has an impact on increasing student religiosity through awareness of *waqf* but also increasing literacy (Isabela & Umam, 2020), if literacy in philanthropic products in the capital market increases, of course financial inclusion in the capital market will also increase (Prasetyo, 2019), so that it also has an impact on improving the Indonesian economy (Selasi & Muzayyanah, 2020). Based on this background, researchers will conduct research related to "Islamic Philanthropy-Based Fintech: Design of a Stock *Waqf* Simulation Application System".

METHODOLOGY

This research is composed of several stages in accordance with the waterfall model used, namely the **first** literature study is the initial step by researching sources that are used as a foundation to support the preparation of reports and as a reference in system development. **Second**, requirements engineering is a method of analysing the needs used, namely the use case diagram. **Third** software design, namely software designed through several stages including sequence diagram design, program code design, and interface design. **Fourth** Implementation, is the

procedure for implementing software based on the analysis and design process that has been carried out. **Fifth** testing in this case the test used is validation testing in a black-box approach. The validation testing technique will perform a test on a case contained in the use case by paying attention to the input and output of the programme is appropriate. **Sixth**, conclusions and suggestions in this case the conclusion will be drawn when the previous stages have been completed such as system design, implementation, and testing. The last stage that will be carried out from this research, making suggestions aims to improve problems during research and in report writing. which is illustrated with the following diagram

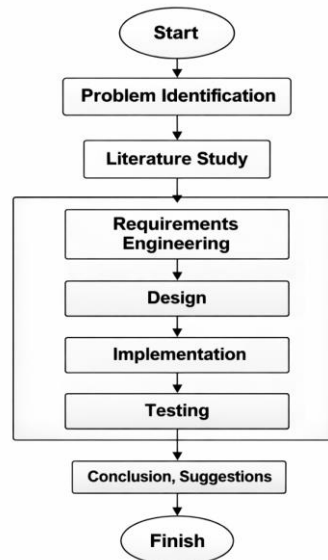


Figure 2. Research Steps

It should be noted that the testing stage in this study was limited to functional validation using a black-box approach, which focused on ensuring that each feature of the application operated according to the defined requirements. This study has not yet involved user-based testing or a pilot study to measure usability, user experience, or learning effectiveness among students. Therefore, further research is recommended to conduct a pilot study involving actual users, particularly students, to evaluate the effectiveness of the WASAM application as a learning medium for improving stock *waqf* literacy. This future stage is expected to strengthen the empirical contribution of the application from both technical and educational perspectives.

RESULT AND ANALYSIS

Result

Improving *waqf* literacy, especially stock *waqf*, is a necessity among educators, so researchers designed a simulation application to be useful in improving literacy among students. this application the author names "WASAM". the steps taken in making the application and the appearance of the application are presented in the description below, **first** Software requirements analysis

This process has the aim of knowing the needs needed for the system and determining the actors / users who interact with the system. The actors who interact with the system directly are students as wakifs who will endow the shares they own. The following is a list of requirements specifications that have been determined:

Table 2. Specification of software requirements

No	Use Case	System Requirements
1.	Login	The system provides a login process into the system.
2.	View transaction panel	The system is able to display the transaction menu to buy or sell shares
3.	View Portfolio panel	The system is able to display the user's stock portfolio
4.	View Waqf Panel	View the endowment panel
5.	Purchase shares	The system is able to run the stock purchase process
6.	Conduct share sales	The system is able to run the stock sale process
7.	Confirmation of share purchase	The system is able to show the confirmation process to reconfirm the share purchase
8.	Share sale confirmation	The system is able to show the confirmation process to reconfirm the sale of shares
9.	Performing stock <i>waqf</i>	The system is able to process <i>waqf</i> shares
10.	Logout	The system provides a logout process from the system

Second is design the design is based on the results of the needs analysis. The several stages in this process include; sequence diagram modeling, program code design, and interface design. Sequence diagram modeling describes the achievement of system requirements through the stages of the process to be carried out. The results of making use cases will become objects in the sequence. Program code is designed to explain the design of the system that will be made later. Finally, the interface design will be the basis for the interface that will be made later.

Third Implementation of the following is an interface that has been created based on the previous design.

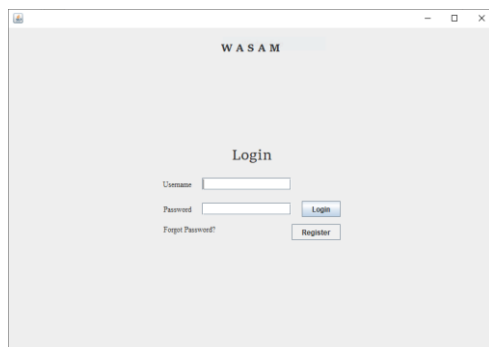


Figure 3. initial view of the application

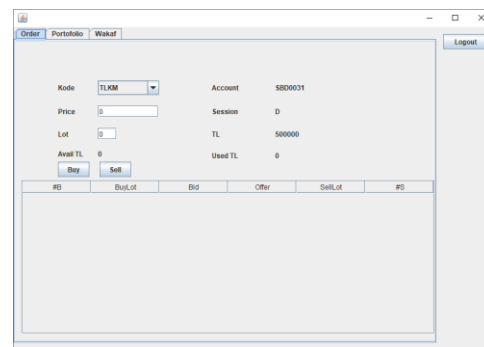


Figure 4. When buying shares

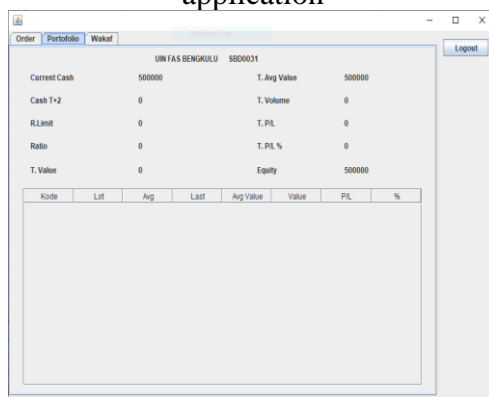


Figure 5. Investor balance

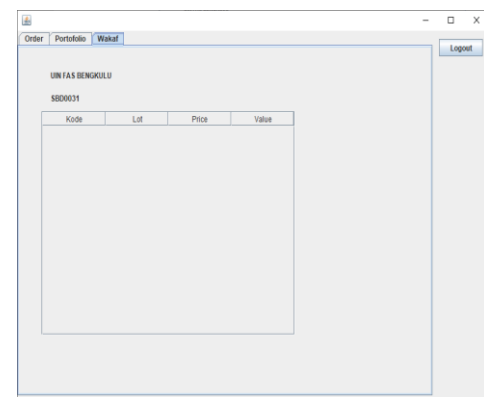


Figure 6. When donating shares

Fourth Test Results, Tests were conducted using validation testing in a black-box approach. Test cases are performed on several use cases by ensuring that the input will produce the appropriate output. Here is one of the tests in the scenario when buying shares.

Table 3. Make a Stock Purchase

Actor	User
Objective	Make a transaction to buy shares
Pre-Condition	User has logged in
Main Flow	<ol style="list-style-type: none"> 1. Select the Order tab 2. Display the transaction page 3. Select the stock code to buy 4. Fill in the share price 5. Fill in the number of lots of shares to buy 6. Pressing the buy button
Alternative Flow	<ol style="list-style-type: none"> 6.1 If the buy button is selected without filling in the stock price field, the system displays the message "Enter Price". 6.2 If the buy button is selected without filling in the stock lot field, the system displays the message "Enter lot". 6.3 If the buy button is selected without filling in the stock and stock lot fields, the system displays the message "Price or lot cannot be empty!". 6.4 If the buy button is selected and the price of the purchased shares exceeds the balance, the system will display the message "Insufficient Balance".
Post Condition	The system redirects to the share purchase confirmation page

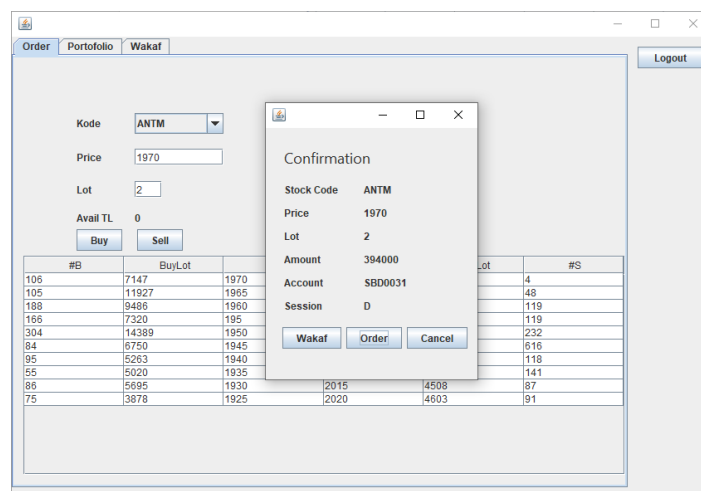


Figure 7. Results when Purchasing Shares

Alternatives when the procedure performed is not appropriate

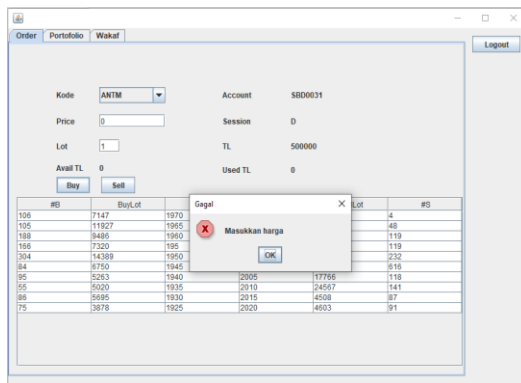


Figure 8. Buying Shares Without Filling in the Share Price

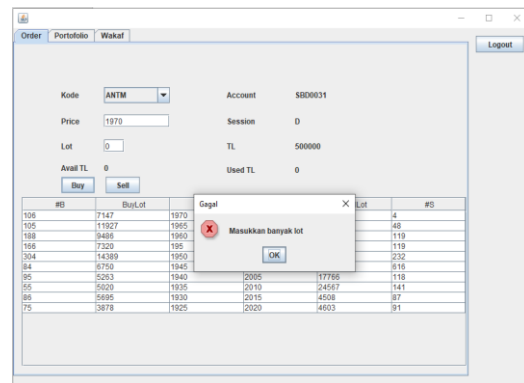


Figure 9. Buying Shares Without Loading Many Lots of Shares

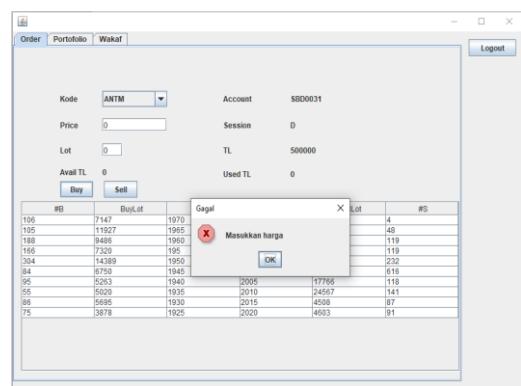


Figure 10. Buying Shares Without Filling Many Lots

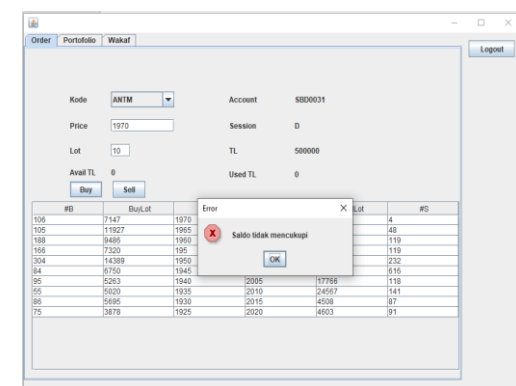


Figure 11. Buying Shares with Total Purchases Exceeding the Balance

Analysis

The development of the WASAM (Student Stock *Waqf*) application is an innovative contribution at the intersection of Islamic philanthropy, financial technology, and educational innovation. This simulation application is specifically designed to address the low literacy of *waqf* shares among university students, who although generally digitally literate, still have limitations in practically understanding Islamic financial instruments such as *waqf* shares.

The results of validation testing using a black-box approach show that the application functions as intended. The system is able to handle both standard usage flows and user input errors well. Any alternative flow scenarios, such as not filling in the share price, number of lots, or making transactions exceeding the balance, are responded to by the system with appropriate error messages. This indicates that the application has good robustness and ability to simulate real interactions in a stock endowment platform.

The novelty of this research lies in the integration of simulation-based learning tools with the concept of Islamic social finance, an area that until now has rarely been touched by technological innovation in the context of education. Some previous studies have indeed discussed the importance of *waqf* literacy and public awareness ((Akbar & Kassim, 2023)(Sulistiani et al., 2021), but not many have developed interactive digital platforms as experiential learning tools, especially in the context of stock *waqf*.

In contrast to conventional lecture-based learning methods, WASAM provides a more active learning experience through direct interaction. This approach is in line with constructivist learning theory which emphasizes that knowledge will be more easily understood and last long if students are directly involved in the contextual learning process (Kumar Shah, 2019) (Mulyati, 2016). By simulating the activities of buying, selling, and endowing stocks, students not only understand the

concepts theoretically, but also gain practical experience that deepens their understanding.

Furthermore, the development of this application also supports the national agenda of increasing financial inclusion and strengthening the Islamic digital economy. As a country with the largest Muslim population and a rapidly growing fintech ecosystem, Indonesia has great potential for innovation in Islamic philanthropy (Isabela & Umam, 2020) (Adinugraha et al., 2023). The introduction of applications such as WASAM in higher education settings can serve as a bridge between conceptual understanding and practical application of Islamic financial instruments.

Thus, successful validation of the WASAM application not only demonstrates the technical readiness of the system, but also its high pedagogical value. This research provides a solid foundation for further development of digital simulation tools to enhance literacy and understanding in various aspects of Islamic economics and finance.

Beyond its technical functionality, the WASAM application also plays an important role as a learning medium for improving students' literacy of stock *waqf*. The simulation-based design allows students to actively engage with the process of buying shares, managing portfolios, and performing stock *waqf* transactions in a structured and risk-free environment. This learning approach is aligned with constructivist learning theory, which emphasizes that knowledge is constructed through direct experience and interaction rather than passive reception of information.

Through the simulation mechanism, students are not only introduced to the concept of stock *waqf* at a theoretical level but are also encouraged to understand the practical stages involved in Islamic capital market activities. The ability to interact with system features, receive feedback from errors, and observe transaction outcomes enables students to build their own understanding of stock *waqf* mechanisms. This reflects the principles of experiential learning, where learning occurs through reflection on simulated actions and outcomes.

Furthermore, the WASAM application supports the development of students' roles as potential wakif and *nazhir* of stock *waqf*. By simulating these roles, students gain a clearer understanding of their responsibilities and decision-making processes within Islamic philanthropy. This experiential exposure is expected to strengthen students' awareness and literacy of stock *waqf*, which is still relatively low among young generations.

Conceptually, the expected learning outcomes from the use of WASAM include: (1) improved understanding of stock *waqf* concepts and mechanisms, (2) increased familiarity with Islamic capital market instruments, and (3) enhanced readiness of students to participate in Islamic philanthropic activities in real contexts. Therefore, the WASAM application not only demonstrates technical feasibility but also provides pedagogical value as an innovative learning tool in Islamic economics education.

CONCLUSION AND RECOMMENDATION

Conclusion

This research successfully developed the "WASAM" stock *waqf* simulation application as an educational media to increase stock *waqf* literacy among students. This application was designed through systematic stages-needs analysis, design, implementation, and testing using the black-box method-and was proven to run optimally with function validity reaching 100%. Key features such as stock trading simulation, portfolio, and stock *waqf* implementation are able to handle various scenarios, including user input errors. This success indicates that the integration of Islamic financial technology and digital learning media can be an innovative solution to strengthen students' understanding of the concept of Islamic social finance, as well as support the national agenda in encouraging Islamic financial literacy and the development of Islamic digital economy in Indonesia.

Despite the successful development and functional validation of the WASAM application, this study has several limitations. First, the evaluation of the application was limited to technical validation using a black-box testing approach and has not yet involved user-based testing or pilot studies to assess usability and learning effectiveness. Second, the application is designed as a simulation application, meaning it does not represent real stock *waqf* transactions in the Islamic capital market. Third, this study is limited to the context of students in the Faculty of Economics and Islamic Business, which may restrict the generalizability of the findings. These limitations provide opportunities for further research to enhance both the technical and educational dimensions of the application.

Recommendation

The WASAM application needs to be integrated into Islamic Economics learning programs in higher education as an effective educational tool to improve students' literacy and practical understanding of Islamic financial instruments, especially *waqf* shares, so as to support the sustainable development of Islamic economics.

In addition, the WASAM application is recommended to be integrated into the curriculum of Islamic economics programs, particularly in courses related to Zakat, Infaq, and *Waqf* (ZISWAF) and Islamic Fintech. The application can be implemented through practical sessions, where students directly use the simulation to understand stock *waqf* mechanisms, as well as through project-based learning, in which students analyze simulated transactions and reflect on their roles as wakif and *nazhir*. This integration is expected to enhance experiential learning and strengthen students' literacy and readiness to participate in Islamic philanthropic activities in real-world contexts.

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