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INTERACTIVE EDUGAME FOR TEACHING DATA AND SHARIA FINANCIAL LITERACY IN INTEGRATED ISLAMIC ELEMENTARY SCHOOLS

Andi Seppewali[1*], Reski Wahyu Yanti[2], Supardi Muh Said[3], Ahmad Adivar[4], Rosmila[5], Bintang Guntur[6]
[1,2,3,4,5,6] Universitas Sulawesi Barat
[1]andi.seppewali@unsulbar.ac.id, [2]reskiwahyuyanti@unsulbar.ac.id, [3]supardi.muhsaid@unsulbar.ac.id, [4]ahmad.adivar@unsulbar.ac.id, [5]rsmylayla@unsulbar.ac.id, [6]bintangpolman289@unsulbar.ac.id

***Corresponding Author:** Andi Seppewali

ABSTRACT
With the increasing complexity of information and the growing importance of understanding data and sharia financial literacy in society, developing effective and engaging learning methods has become crucial, especially at the elementary school level. The objective of this study is to develop and implement an interactive edugame based on the Guided Discovery approach as a learning tool to enhance students' data and sharia financial literacy. The research method employed is the R&D approach, following the 4D stages: define, design, develop, and disseminate. A comprehensive literature review was conducted to design an interactive edugame that aligns with learning needs and principles. The edugame development process includes graphic design, software coding using HTML5 and Android Studio, as well as iterative testing and revisions. The edugame implementation was carried out at an Integrated Islamic Elementary School, involving training for teachers and students, along with mentoring during the learning process. Furthermore, this study is expected to contribute to the development of innovative learning approaches, particularly in the context of data and sharia financial literacy at the Integrated Islamic Elementary School level.

Keywords: Data Literacy, Interactive Edugame, Guided Discovery Approach, Sharia Financial Literacy, Innovative Learning Methods

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INTRODUCTION

The education and learning system in Indonesia faces complex and diverse challenges. According to data from the Ministry of Education, Culture, Research, and Technology (Kemendikbudristek), there is still a gap in education access between urban and rural areas, as well as between different islands across Indonesia (Asrin et al., 2022). The diverse education system, consisting of public schools, private schools, and madrasahs, often faces disparities in resources, facilities, and teaching quality. In addition, there are still challenges regarding the quality of teaching and learning, where the use of innovative and effective teaching methods needs to be improved (Lestar et al., 2022). Innovative learning methods such as project-based learning, cooperative learning, and technology-based learning can be effective alternatives to enhance student literacy (Ariyati, 2015). Literacy development at the elementary school level requires an approach that is suited to the characteristics and needs of students at that age. For instance, the use of technology in learning, such as interactive learning applications or digital educational games, can make

learning more engaging and interactive for students. This can also help students become more involved in the learning process and increase their motivation to learn (Garg et al., 2018).

Guided Discovery is a learning approach that allows students to develop their understanding through guided exploration and teacher support (Freeman et al., 2009). With this approach, students are given the opportunity to discover new concepts independently through a series of questions or problems guided by the teacher. Through interactive edugames, students can engage in exploration and problem-solving either independently or in collaboration with their classmates, while receiving guidance and feedback from the teacher (Hikmah, 2020).

In the context of Integrated Islamic Elementary Schools, the development of interactive edugames can serve as an effective tool to enhance data and sharia financial literacy learning. By utilizing technology and innovative learning approaches, schools can create an engaging and inclusive learning environment (Haselton et al., 2017). The development of interactive edugames for teaching data and sharia financial literacy in Integrated Islamic Elementary Schools is particularly relevant given the importance of mastering data and sharia financial literacy from an early age. Data literacy, which involves understanding, analyzing, and effectively utilizing data (Cahyani et al., 2016), and sharia financial literacy, which includes understanding the principles of Islamic finance, are essential skills in the digital era and the complex global economy (Haryati et al., 2020).

The results of the Financial Literacy and Inclusion Survey by the Financial Services Authority (OJK) in 2019 revealed that only about 38% of the total population in Indonesia has good financial literacy. Additionally, reports from the Central Bureau of Statistics (BPS) show that data literacy in Indonesia is still relatively low, with a lack of understanding in data processing and interpretation. Moreover, in the context of Islamic finance, despite Indonesia having the largest Muslim population in the world, financial literacy in Islamic finance among the public remains quite low. A study from the Indonesian Waqf Board indicated that only about 17% of Indonesia's population has a good understanding of the principles of Islamic finance. Therefore, the use of interactive edugames with the Guided Discovery approach could be an effective solution to enhance students' understanding and skills in data and sharia financial literacy.

The research was conducted at SDIT Tahfidzul Qur’an Majene, with 319 students enrolled and an accreditation of B (Directorate of PAUD 2024). The school implements the Merdeka Curriculum for grades I, II, V, and VI, starting in the 2022 and 2023 academic years, with the implementation already ongoing for four semesters. Based on initial observations and direct communication with teachers at the school, it was found that interactive learning materials or media have not been used to their full potential in the learning activities. This research aims to test how significant the developed edugame is in accommodating student learning methods, ensuring its relevance and effectiveness in supporting the learning process at school (Anderson, 2021). Therefore, this research is highly urgent in addressing this literacy gap by developing innovative learning methods that can enhance students' understanding and skills in data and sharia financial literacy.

METHODS

The researcher used observational techniques to understand the teaching model applied by the teachers during the learning process. In addition, interviews were conducted with teachers to obtain more in-depth information related to the learning process. Furthermore, to gather feedback from the research subjects, the researcher used a questionnaire distributed via Google Form (Yazid et al., 2021). The Research and

Development (R&D) approach was used in this study to bridge basic and applied research. The 4D method applied in this study includes the stages of define, design, develop, and disseminate, as illustrated in Figure 1.

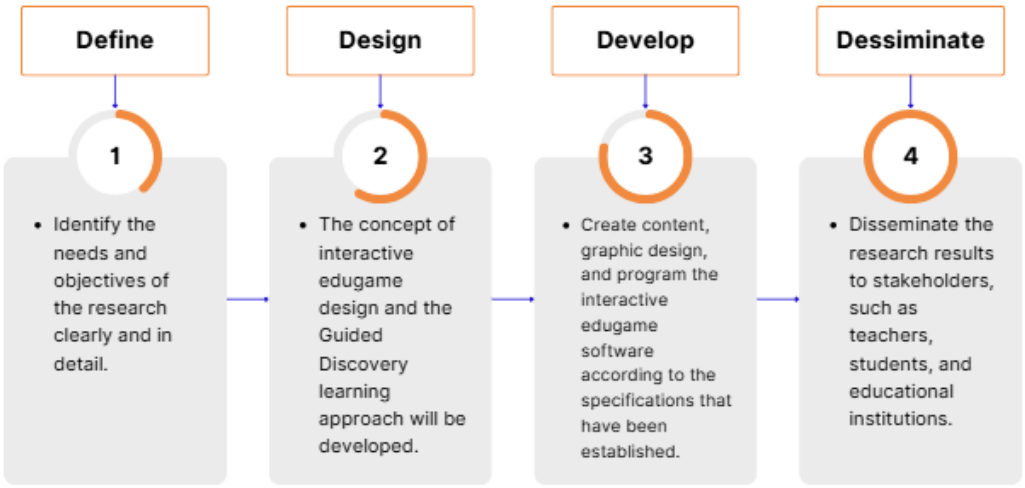


Figure 1. Development with the 4D Method

The first stage begins with the define phase, which involves identifying the needs and objectives of the research clearly and in detail. The team defines the scope of the research, learning objectives, and the final goals to be achieved through the development of the interactive edugame (Nurbani & Puspitasari, 2022). The output of this phase is a document detailing the needs and objectives of the research, reflecting a clear definition of the research scope.

The design phase focuses on creating a clear and engaging framework aligned with the learning objectives. This involves developing a storyline that not only captures students' attention but also facilitates the discovery and learning process. Additionally, the game structure is carefully planned to ensure it is educational and interactive, encouraging students to actively engage in the learning process. The integration of learning elements, such as short answers, drag-and-drop, and feedback mechanisms, ensures that the game supports the development of essential skills in data literacy and financial literacy in a fun and approachable manner. During the development phase, the design is translated into a functional product, with attention to usability and accessibility, ensuring that the game is compatible with targeted devices and platforms. The use of HTML5 and Android Studio allows for the creation of responsive and scalable games that are easily accessible by students across various devices.

The data analysis technique used in this research is quantitative data analysis. The evaluation data obtained from the validators are analyzed descriptively and qualitatively, guiding the revision process to produce a feasible product (Supratman, 2018). The developed product design is evaluated by validators using a validation sheet (Wendi et al., 2023). The table below provides a detailed breakdown of the aspects and indicators assessed by the validators. Each aspect includes specific dimensions and criteria evaluated to ensure the quality and feasibility of the interactive digital mathematics learning application. The number of criteria within each dimension is also included to illustrate the scope of the evaluation.

Table 1. Validation Aspect Table

Validation Aspect	Item	Criteria
Learning Media	Component Aspect	Content alignment with the curriculum
		Availability of material components
	Content Aspect	Use of clear and fluent language
		Effective application features
	Interface Aspect	Ease of interface use (user-friendly)
		Availability of navigation tools and quick access to relevant pages
		Availability of search features
	Interactivity Aspect	Interactive application design with interactive components
	Technology Aspect	High resolution and quality of components
		Smooth application performance on Android and Windows platforms
Content	Introduction Aspect	Alignment of introduction with learning objectives
		Clarity in describing the purpose of the application
	Content Aspect	Precision of mathematical concepts presented
		Correctness of terminologies and formulas
		Use of multimedia to support content delivery
	Learning of Data Literacy and Islamic Financial Aspect	Applicability of content to real-world Islamic financial principle
		Coverage of essential data literacy concepts
		Clarity of explanation for data analysis techniques
		Integration of case studies or examples from Islamic finance
		Use of scenarios to encourage critical thinking
	Curriculum Aspect	Compatibility of learning goals with curriculum standards
		Coverage of key topics specified in the curriculum
		Logical organization of learning modules
		Practicality of implementation within classroom settings
		Support for both independent and guided learning
	Final Test Aspect	Clear and concise instructions for test items
		Alignment of test questions with learning objectives
		Representation of all key concepts covered in the course
		Immediate feedback for correct and incorrect answers
Language	Readability	Use of proper and correct language
		Alignment of language usage with student level
		Correct use of mathematical terms
	Implementability	Application usability anytime and anywhere
		Motivation for students to learn independently
		Attractiveness of the application

The product underwent direct testing to ensure its quality and relevance in a real learning environment. The evaluation process was carried out using assessment questionnaires and field observations, aiming to measure how effectively the product enhances the learning experience and meets the intended educational needs (Supriadi et al., 2022). This trial involved end users, including students and teachers, to gather constructive feedback on both the technical and pedagogical aspects of the developed product. The validator not only assessed technical feasibility but also focused on interactivity, content usefulness, and alignment with the curriculum. The product feasibility categories were determined based on criteria formulated through theoretical studies and needs analysis, as presented in Table 1. This process ensured that the product could be evaluated using clear indicators, covering both functionality and its practical application in the field.

The final stage of the research involved the dissemination of findings to stakeholders at SDIT Tahfidzul Qur'an Majene. Dissemination activities were conducted with the

participation of 9 teachers and 27 students through presentations, training sessions, and product demonstrations to introduce this educational innovation. The objective of this phase was to encourage adoption and integration of the product into daily teaching practices, allowing it to deliver a sustainable positive impact. Feedback from stakeholders during this phase further enhanced the product's effectiveness and relevance. Thus, the developed product not only benefits the target school but also has the potential to be adapted by other institutions seeking similar solutions. This approach ensures continuous improvement and fosters long-term success.

$$P = \frac{\sum x}{\sum xi} \text{ x } 100\% \quad (1)$$

Explanation :
P = percentage
$\sum x$ = total responses from respondents
$\sum xi$ = total ideal scores
100% = constant

Table 2. Media Feasibility Criteria

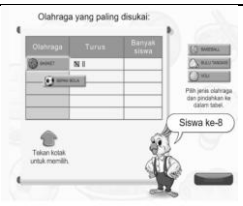
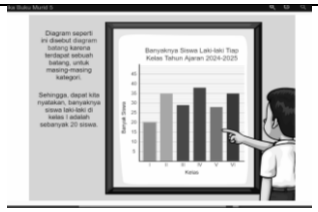
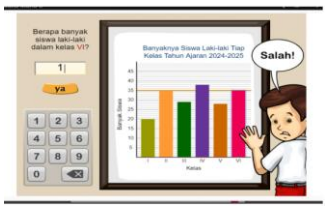
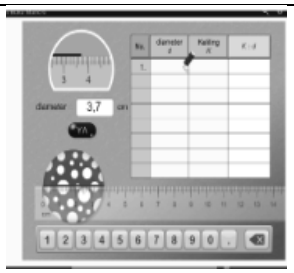
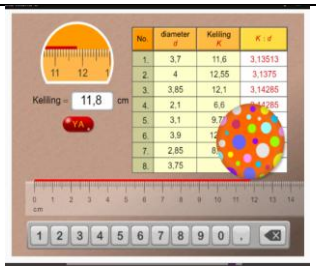
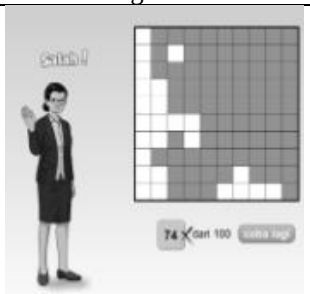
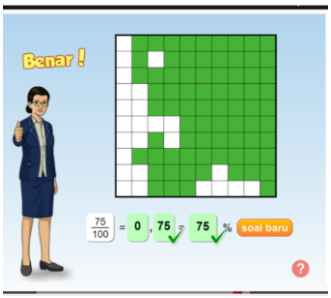
No	Average Feasibility	Criteria
1.	$x > 4{,}2$	Very Feasible
2.	$3{,}4 < x \leq 4{,}2$	Feasible
3.	$2{,}6 < x \leq 3{,}4$	Sufficiently Feasible
4.	$1{,}8 < x \leq 2{,}6$	Less Feasible
5.	$x < 1{,}8$	Very Unfeasible

RESULTS AND DISCUSSIONS

Data collection in this research utilized questionnaires distributed to two media experts, two subject-matter experts, one language expert, and several student respondents. Respondents first trialed the interactive learning media before completing the assessments. Media experts provided input on technical and design aspects, while language experts assessed readability and usability. The data were analyzed to guide product revisions based on the feedback received.

The development of the interactive learning edugame, designed for both web and Android platforms, utilized HTML5 and Android Studio. During the analysis phase, a needs analysis was conducted along with the selection of learning materials. In the design phase, the process involved creating a Sketch UI/UX Design, developing a storyboard, and selecting the media components to be used. The product was also validated by subject-matter and media experts. In the implementation phase, the product was tested on a small group of respondents to gather user feedback. Finally, the evaluation phase was conducted both formatively and summatively. A summary of the interactive edugame's appearance and functionality, before and after the evaluation phase, is presented in Table 3.

Table 3. Media Edugame Interface

No	Media Interface		Description
	Before Validation	After Validation	
1	 Initial Screen	 Initial Screen	The opening screen of the Edugame application displays the logo and application name. This screen includes a button to start the game, accessible with a click.
2	 Collecting Items Game	 Collecting Items Game	In this game, users are tasked with collecting data in table form, such as selecting the most liked sports among students. This data is entered into a table for further processing.
3	 Data Diagram Calculation Game	 Data Diagram Calculation Game	The collected data is visualized as a bar chart. Users calculate and analyze the data, with features to check answers. If incorrect, the system provides direct feedback, aiding interactive learning.
4	 Measuring Items Game	 Measuring Items Game	Users measure objects using tools like rulers or calculate the circumference of circular objects. The measurement data is entered into a provided table.
5	 Data and Percentage Value Game	 Data and Percentage Value Game	This game teaches users to calculate percentages based on available data. Correct answers are rewarded with a "Correct!" message to provide appreciation and motivation.

6	 Material on Asset Zakat	 Material on Types of Money	Educational material about asset zakat, including explanations of zakat rules, types of assets subject to zakat, and related provisions, which users can read.
7	 Material on Money Storage	 Currency Value Game	Material and games about different types of money. Users learn about various forms of money, their functions, and the differences between types, presented visually with currency images.

Based on the validation results presented in Table 4, it can be concluded that the edugame product underwent rigorous assessment by two validators specializing in media evaluation. The product received excellent scores across several validated aspects. For the content aspect, the edugame product was rated very highly with a perfect score of 5 from both validators, resulting in an average score of 5. This score signifies that the product meets the established standards and is considered Very Feasible in terms of the quality and relevance of the material presented. The content was validated as being highly appropriate for achieving the learning objectives and effective in enhancing students' understanding of the targeted concepts.

Table 4. Media Expert Validator Results

No	Item	Criteria	Validator 1	Validator 2	Average	Criteria
1.	Component Aspect	Content alignment with the curriculum	4	5	4,5	Very Feasible
		Availability of material components	4	5	4,5	Very Feasible
2.	Content Aspect	Use of clear and fluent language	5	4	4,5	Very Feasible
		Effective application features	5	4	4,5	Very Feasible
3.	Interface Aspect	Ease of interface use (user-friendly)	5	4	4,5	Very Feasible
		Availability of navigation tools and quick access to relevant pages	5	4	4,5	Very Feasible
		Availability of search features	5	4	4,5	Very Feasible
4.	Interactivity Aspect	Interactive application design with interactive components	3	4	3,5	Feasible
5.	Technology Aspect	High resolution and quality of components	4	5	4,5	Very Feasible
		Smooth application performance on Android and Windows platforms	4	5	4,5	Very Feasible
Average Media Expert Validation Score					4,4	Very Feasible

In the interface aspect, the application received an average score of 4.5 (Very Feasible), with a score of 5 from the first expert and 4 from the second expert, indicating

that its design is very user-friendly and facilitates student interaction. In the interactivity aspect, the average score of 3.5 reflects room for improvement to encourage more active participation from students. In the technology aspect, the application achieved an average score of 4.5, indicating the use of relevant technology to support learning. Overall, the application received an average rating of 4.4, which falls into the very feasible category, although improvements in interactivity are needed to enhance student participation and the effectiveness of learning. Further development of interactive elements is a crucial step in optimizing the application.

Table 5. Content Expert Validator Results

No	Item	Criteria	Validator 1	Validator 2	Average	Criteria
1.	Introduction Aspect	Alignment of introduction with learning objectives	5	5	5	Very Feasible
		Clarity in describing the purpose of the application	5	5	5	Very Feasible
2.	Content Aspect	Precision of mathematical concepts presented	5	4	4,5	Very Feasible
		Correctness of terminologies and formulas	5	4	4,5	Very Feasible
		Use of multimedia to support content delivery	5	4	4,5	Very Feasible
3.	Learning of Data Literacy and Islamic Financial Aspect	Applicability of content to real-world Islamic financial principles	4	5	4,5	Very Feasible
		Coverage of essential data literacy concepts	4	5	4,5	Very Feasible
		Clarity of explanation for data analysis techniques	5	4	4,5	Very Feasible
		Integration of case studies or examples from Islamic finance	4	5	4,5	Very Feasible
		Use of scenarios to encourage critical thinking	4	5	4,5	Very Feasible
4.	Curriculum Aspect	Compatibility of learning goals with curriculum standards	4	5	4,5	Feasible
		Coverage of key topics specified in the curriculum	4	5	4,5	Feasible
		Logical organization of learning modules	4	3	3,5	Feasible
		Practicality of implementation within classroom settings	3	4	3,5	Feasible
		Support for both independent and guided learning	4	4	4	Feasible
5.	Final Test Aspect	Clear and concise instructions for test items	4	4	4	Feasible
		Alignment of test questions with learning objectives	4	4	4	Feasible
		Representation of all key concepts covered in the course	4	4	4	Feasible
		Immediate feedback for correct and incorrect answers	4	4	4	Feasible
Average Content Expert Validation Score					4,3	Very Feasible

Table 5 shows the assessment results by content experts for five item aspects. The results indicates that the introductory aspect received a perfect score of 5, which indicates that this aspect is Very Feasible and of excellent quality. In the content aspect, the first expert gave a score of 5, while the second expert gave a score of 4, resulting in an average score of 4.5. With this average, the content aspect is considered very feasible. Although there is a slight difference between the two experts, the high average score suggests that the content

provided in the edugame is highly relevant and aligns well with the intended learning objectives. The aspect of data and Islamic financial literacy received an average score of 4.5, indicating that the material is also very feasible although there is some room for improvement in certain details of the delivery. The overall average score obtained from the five aspects of content validation item is 4.3, which qualitatively falls into the very feasible category. This result indicates that the developed edugame meets the feasibility standards and can be relied upon as an effective learning media.

Table 6. Language Expert Validator Results

No	Item	Criteria	Validator 1	Validator 2	Average	Criteria
1.	Readability	Use of proper and correct language	5	5	5	Very Feasible
		Alignment of language usage with student level	5	5	5	Very Feasible
		Correct use of mathematical terms	5	5	5	Very Feasible
2.	Implementability	Application usability anytime and anywhere	4	5	4,5	Very Feasible
		Motivation for students to learn independently	4	5	4,5	Very Feasible
		Attractiveness of the application	4	5	4,5	Very Feasible
Average Languange Expert Validation Score					4,75	Very Feasible

Based on Table 6, the average score from language experts is 4.75, which falls into the very feasible category. In the readability aspect, a perfect score (5) indicates that the language used in the edugame is highly understandable and aligns with the comprehension level of users, particularly students. Meanwhile, the usability aspect received an average score of 4.5, reflecting that the language effectively supports learning implementation across various contexts. These results affirm that the edugame demonstrates excellent language quality, not only in terms of readability but also in facilitating its operational use. During the dissemination phase, which involved school principals, teachers, and students at SDIT Tahfidzul Qur'an Majene, the product was presented through training sessions and demonstrations. Feedback from stakeholders highlighted the edugame's effectiveness in enhancing student engagement and its potential for integration into daily teaching practices. This positive reception further validated the product’s suitability as an interactive learning medium to enhance students' learning experiences effectively.

CONCLUSIONS

This research demonstrated that the interactive edugame developed for integrated Islamic elementary schools, specifically at SDIT Tahfidzul Qur'an Majene, is highly effective in enhancing data literacy and Islamic financial literacy. The product received very feasible ratings from media, material, and language experts, highlighting its strengths in visual design, content quality, and readability. The evaluations emphasize the edugame’s ability to provide an engaging and educational learning experience, successfully increasing student participation, comprehension, and engagement. This underscores its suitability as a practical and impactful learning medium tailored to modern educational needs. While areas like interactivity and curriculum alignment require further refinement, the overall results

affirm the edugame's significant potential as an innovative tool for improving educational outcomes.

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