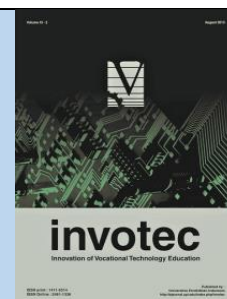




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SERIES OF DIGITAL BASED MATERIAL AS INNOVATION FOR MARINE AND FISHERIES EDUCATION LEARNING MEDIA

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ABSTRACT

Smartphone users are increasing every year. This increase is due to the functions of smartphone technology, which help a lot to meet the needs of the community, social media, entertainment, shopping, work, managing finances, health and education. This must be anticipated by increasing digital-based educational content to optimise opportunities for improving technology to accelerate the quality of education. The development of learning materials in digital form is arranged in an android-based application. Innovative use of information and communication technology (ICT) to support marine and fishing learning strategy lectures in the form of application breakthroughs to optimise learning. This research aims to make learning media innovations related to the marine and fishing learning strategy lecture process. This study uses the DBR (Design-Based Research) method in the form of qualitative data collection and descriptive analysis. Data collection was carried out in a mixed manner, namely by providing direct and indirect questionnaires, then quantitatively processing them using the DBR approach. The results of this research are an Android-based learning media innovation with information on marine and fisheries learning strategy lecture material that is packaged as attractively as possible and has a user-friendly display to make it easier to use.

1. Introduction

The use of Information and Communication Technology (ICT) by the population in Indonesia continues to increase. In 2019, it recorded an increase of up to 63.53% (Badan Pusat Statistik, 2019). The increase in the number of smartphone users cannot be controlled; this is because the price of smartphones is increasingly affordable and equipped with increasingly sophisticated features, and in 2022 there will be 6,567 million smartphone users worldwide (O'Dea, 2022). Information and

communication technologies are very helpful in the learning process. Shin (2015) opined that technology is a container or means that can be used to describe learning materials with the aim of making students more passionate and interested in learning.

The development of ICT provides various conveniences for its users, such as finding information, social media, entertainment events, shopping, managing work, managing finances, health consultations, and implementing education. Technological developments must be utilised as a means of improving the quality of education in Indonesia. ICT in education can improve the quality of student learning, provide education to students without limited access to education, help facilitate teacher training, and improve the skills of educators (Adarkwah, 2020). The development of digital technology, especially in education, is an opportunity as well as a threat that must be watched out for. Those who use digital-based technology tend to be easier to communicate with and more helpful in completing tasks (Naghdipour, 2022). Skillful application of ICT can have a major impact on learning. For instance, it could make it easier for students to find online resources, improve their cognitive skills, and help them learn new skills (Prizel-Kania, 2015).

The development of android-based learning media as a learning media innovation (Yang & Li, 2020). Learning media innovations that support blended learning (Kheradmand & Amirlatifi, 2022). The teaching in the Marine and Fisheries Education Study Program uses a blended learning model that requires supporting learning media for smooth learning. The innovation of android-based learning media is in the form of learning materials, lesson plans, learning videos, evaluations, and group chats. The development of technology is increasing; technology-based learning media can be utilised to support the sustainability of media-based learning that can be utilised optimally and has more advantages compared to face-to-face learning (Lim, 2022).

Using mobile phones as a learning medium is now a habit and a necessity (Hsin & Torous, 2018). Android-based Learning Media is relevant as a support for Blended Learning learning in the Marine and Fisheries Education Study Program (Salsabila et al., 2020). The use of mobile phones is very helpful for teachers in teaching. In addition, the learning process also becomes more fun. Through Android-based ICT, teachers can combine pedagogic knowledge with technology so that they can produce students who are insightful and enthusiastic about learning (Iqbal, 2017). Competency-based learning using suitable learning media is expected to produce competent students in their fields (Satibi, 2020). This research focuses on creating android-based learning media that contains learning materials, learning videos, learning evaluations, and group chats as direct conversations. The development of learning media that is user-friendly and easy to use.

2. Methods

This research was designed to develop software (prototype) in the marine and fisheries learning strategy course in the marine and fisheries education department. This research is in the form of a design to produce a product in the form of an android-based application. Qualitative

methods are used in the needs analysis stage and in making a design until the final process of making the application.

The selection of qualitative methods with the design process is assumed because the purpose of this research is to present learning material packaged in a simple way that can be used as a valid learning instrument. The research aims to create a digital learning media innovation in the marine and fisheries learning strategy course. This study uses an approach by DBR (Design Based Research). In the field of education, DBR is a set of ways to come up with new theories and practises that explain something and could change the way people learn on their own.

Design-Based Research, abbreviated as DBR, is a systematic study of the design, development, and evaluation of educational interventions (e.g., programs, strategies, and learning materials, products, and systems) as solutions to complex problems in educational practise (Akker et al., 2007). The aim of the design and development process (such as the learning process, the learning environment, etc.) is to develop or test a theory. This is done by making us more aware of the nature of the intervention.

This research is divided into several stages: introduction, design, iteration (trial and implementation), and evaluation to optimize product quality, as described in the flow diagram (figure 1). Figure 1 shows a flowchart of the steps in this research: introduction, design, iteration (trial and implementation), and evaluation to improve the quality of the product.



Figure. 1. Research flowchart

This study uses a survey method by distributing questionnaires and application products in a blinded manner to the objects of observation of students, especially the marine and fisheries majors, with a minimum target of 20 respondents in the form of opinions or arguments conveyed through the questionnaire. The responses from the respondents will be analysed descriptively, and conclusions will be drawn from each response before being analysed and presented in the form of diagrams. The application is designed using a simple interface (application initial screen) which aims to be easy to understand and operate by users. The application design is equipped with material that has been summarised and is equipped with images and videos as visualisation media which makes it easier for users to understand the material provided.

The sampling technique used was purposive random sampling, a sampling technique with predetermined criteria (Arter & Tighe, 2001). The number of samples was taken by two groups, with the criteria of lecturers from the fisheries department and students from the fisheries department. These criteria are very suitable to be used as a basis for implementing the designed application because they already represent aspects of fisheries academics in knowledge and skills.

The research spectrum explains that tools are needed to collect, examine, investigate, process, analyze, and present data systematically and objectively, and these tools are called research instruments (Cresswell, 2010). Several research instruments were used in this study. This includes using a sample of 20 respondents

Observation in research is a form of pre-research that was carried out in several classroom learning activities to measure the need for the application of learning media to make classroom learning effective. The result of this observation is a small note that will later be formulated regarding the problem of learning media in the form of an android application. The result of this observation is a small note about the problem of learning media that will later be made into an Android application.

The study used unstructured interview techniques. Interviews were conducted with lecturers and students majoring in fisheries. This technique is used to determine user needs regarding the application to be developed. Interviews were conducted on the problems of learning media and Android-based application development.

This study uses data collection techniques using a blended questionnaire to collect data related to Android testing and student responses to the developed application. The instruments used in this study consisted of instruments for usability, responses to task assessments, and an Android base apk, using a Likert scale answer on a scale of 1-4. The tool aimed at fishery lecturers and students assesses the application's feasibility.

The instrument for usability testing uses an evaluation sheet in the form of a questionnaire or questionnaire, namely the USE Questionnaire (Muderredzwa & Nyakwende, 2010). The use Questionnaire consists of four quality components: usefulness, satisfaction, ease of use, and ease of learning. The scale used in this questionnaire is a Likert scale, consisting of four points to obtain ordinal data. The ranking includes strongly agreed (SS), agree (S), doubtful (R), disagreed (TS), and strongly disagreed (STS) (Sluijsmans, 2008).

3. Result and Discussion

This Android-based application is designed as a learning medium in the marine and fishing learning strategy course. The stages of application design use the Design-Based Research (DBR) method to produce applications based on the material aspect's needs and the ease of understanding of their users. This android-based application's design has stages following the DBR method, namely preliminary study, development, iteration, and evaluation (Mestre et al., 2018). The stages of designing this android-based application will be described as follows (Hake, 2014).

This preliminary study serves as the initial stage for the topic to be researched and explores the problems that will be discussed in the research.

3.1 Literature study

This literature study serves to collect information relevant to the topic that is the object of research. Researchers from several journals contain information that competency-based learning can be applied in vocational education by integrating holistic instruction with the latest ideas in research (Akker et al., 2007). This application can be implemented in vocational schools, on campus, or even for the general public. Using learning media is improved by a number of technological advances that make it easier to explain things to students in class.

3.2 Field survey

This research process is carried out by carrying out observations and interviews with students majoring in marine and fisheries. This research process begins with observations and interviews with students around the Universitas Pendidikan Indonesia Campus in Serang by asking several questions related to the efficiency of learning during online learning. Most of the people who were interviewed said that distance learning during online school was not very effective because teachers gave students the same learning materials over and over again (Wang & Hannafin, 2005).

Interviewees tried the MAFREN application so that researchers got the necessary data. According to the resource people, the application was made to facilitate learning because it was only a click away, and students were able to access the material that had been summarized. The appearance of the application varied so that students were interested in learning. The correction from resource persons regarding the MAFREN application is that there are several hidden icons and they must be scrolled first to click on the icon, so that it makes students confused, and the colour selection of the application display is not coherent (Baltacı et al., 2016).

3.3 Development

3.3.1 Identifying problems

The problems identified were obtained from observations and interviews that have been carried out, resulting in the conclusion that online learning shows a lack of effectiveness in the online learning process that is felt by students around the Indonesian Education University Campus in Serang. Monotonous learning can make it ineffective in existing online learning activities. Therefore, it is necessary for teachers who can make learning media more varied and exciting, such as making special learning applications for certain subjects that can make student learning more exciting and varied (Talanquer, 2014). Researchers give an overview of the plan to design learning media in the form of an Android-based application that is effective, efficient, and user-friendly, has a simple display, and can be used for online learning (Hira & Hynes, 2019). The following are the user-friendly Android Based-Test design stages.

3.3.2 Use case diagrams

When the user opens the application, it will immediately display the home page. After that, the user is given menu options in Material, Attendance & Evaluation, and More Info. The Material menu contains a page containing the total learning meetings for one semester and contains material in the form of ppt and videos at each meeting. Meanwhile, the Attendance & Evaluation menu contains two options, namely attendance and evaluation; if the user selects attendance, the application will create a Google form that has been set for attendance use, while if the user selects evaluation, the application will process the page transfer from the Attendance & Attendance page and the evaluation page that uses the Quizizz platform. Furthermore, if the user selects the More Info menu, the user is faced with three menu options, namely KI & KD, Learning Objectives, and Achievement Indicators. The three submenus contain each object according to its name.

Students opening the application will see instructions for working on questions; after understanding, the student will then enter the identity of the name, class, and active email to use - as a login requirement. After the student successfully inputs the data, they will see the questions, fill in the answers, and see the test results. Lecturers who have registered for the application can see the test results of students who have finished working on the questions. The MAFREN Application Flowchart can be seen in Figure 2.

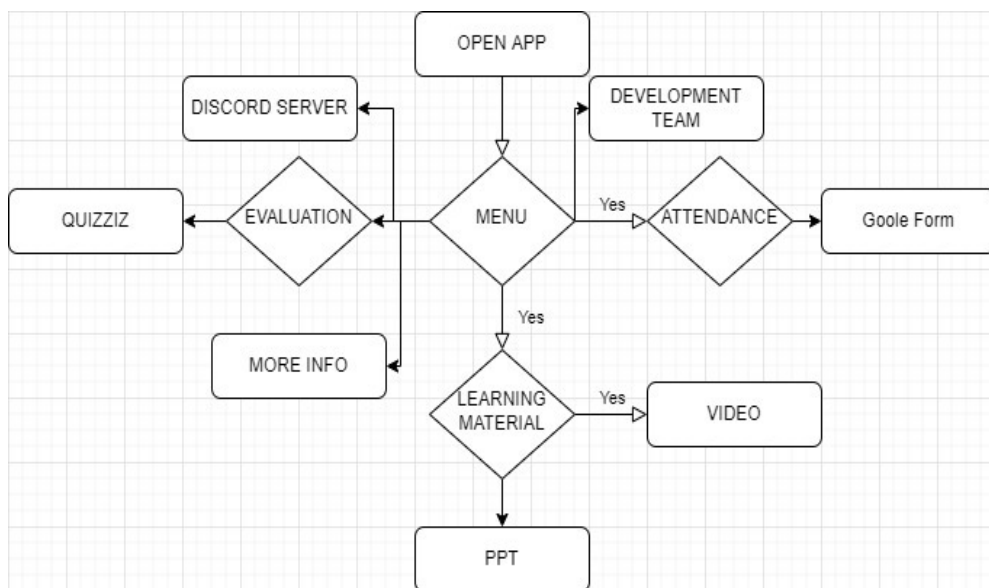
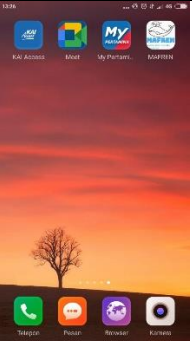





Figure. 2. MAFREN application flowchart.

Storyboard as a guide, starting from making applications from the production process to the editing process, so that the process is easier and the results are appropriate. Storyboard plays a big role in the process of making android-based learning media (Taylor et al., 2021). The Storyboard serves to describe the story line, from the beginning to the end In addition, storyboards also function to plan the application development process so that it is more structured (Shaw et al., 2020). The Storyboard can be seen in Table 1.

Table 1. Storyboard planning for making learning media applications to make it easier to convey ideas

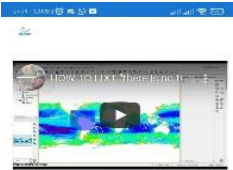
No	Figure	Information
1.		Icon display in Android dashboard
2.		Application main menu display
3.		Application main menu display
4.		Learning material display

5.



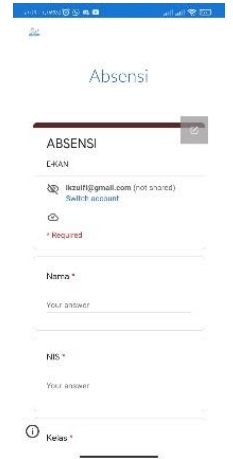
Display of learning materials

6.



Learning video display

7.



Attendance display

8.



Learning evaluation display

9.



Quiz display

10.



More information display

11.



Group chat display

The test results are based on a questionnaire with five answer criteria. Testing is also done using Microsoft Excel software. Based on the test results in the table, it can be seen that the percentage for each assessment is as follows:

Total number of items	= 148 + 74 + 20 + 0 + 0	= 242
Strongly Agreed	= (148/242) x 100%	= 61.1%
Agreed	= (74/242) x 100%	= 30.6%
Neutral	= (20/242) x 100%	= 8.3%
Disagreed	= (0/242) x 100%	= 0%
Strongly Disagreed	= (0/242) x 100%	= 0%

Based on how each assessment indicator was calculated, it's clear that most respondents agree that the MAFREN application is easy to use.

3.4 Data analysis

The percentage of answers from respondents is calculated based on the total score obtained by each question compared to the total score, which is then multiplied by 100%. The following figure 3 shows the value obtained by each question:

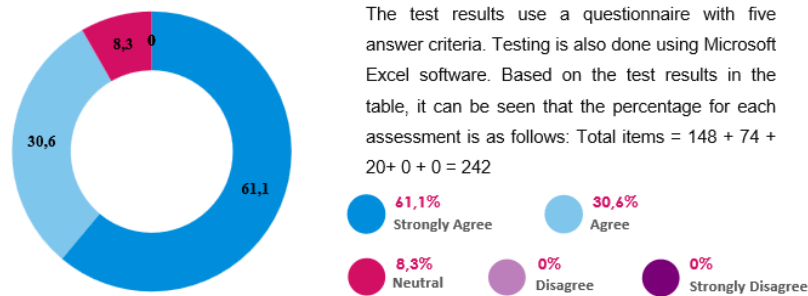


Figure 3. Percentage of value for each question

4. Conclusion

One of the uses of ICT is that it can support educational content, educational processes, educational organization, and management. The development of ICT in facilitating and optimising the educational process has not been fully utilized, especially in fisheries, to maximize the potential of Indonesian fisheries. The researcher offers a solution using this android-based learning media application using the MAFREN application to streamline online learning activities. It is hoped that this android-based application learning media solution can be used and become a substitute learning media for teaching medium in general, which is monotonous and not varied. There are many steps to making this Android application, such as figuring out what the user needs, designing the system, putting it into action, testing it, and thinking about it.

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