



The “INOMARI” Android Application as a Model of Distance Learning Media for Vocational School

Ahmad Fathan Rizqi Irawan^(✉), Didit Widiatmoko Soewardikeoen, and Adrian Ariatin

Design Magister, Telkom University, Bandung 40257, Indonesia
fathanirawan09@gmail.com

Abstract. Distance Learning due to the Covid-19 pandemic has challenged many schools, especially for vocational schools which have the main competence in the form of practice. The research took place at SMKN 1 Simpang Empat, South Kalimantan which has the main problem that only 15% of students achieve the minimum passing criteria score during the year 2021. This problem arises because the existing distance learning media is less effective. This study aims to develop a model of distance learning media at State Vocational High School 1 Simpang Empat, South Kalimantan. The design thinking[1] approach along with the concept of “8 Golden rules of interaction design”[2] are used in designing the new learning media. The result of this research is the “INOMARI” android application as a model of interaction design that can be used to make learning media in digital form. The concept of this application can be adapted for making other learning media according to school needs.

Keywords: Interaction Design, Distance Learning, Media, Design Thinking

1 Introduction

SMKN 1 Simpang Empat is a vocational high school that was founded in 2000 in Simpang Empat, Tanah Bumbu, South Kalimantan. At the beginning of its establishment, SMK Negeri 1 Simpang Empat only had two majors. The high interest of the local community to send their children to school has made the school continue to grow so that in 2022 there will be a total of 10 majors, including the Food Crops & Horticulture Agribusiness department. Along with the government’s policy that requires all learning and classroom activities to be abolished in 2020, SMK Negeri 1 Simpang Empat is implementing an online learning process. The Food Crops & Horticulture Agribusiness department majors who have practical learning competencies have several obstacles in carrying out online learning, especially in the subjects of Nursery & Tissue Culture.

After passing the first year of online learning implementation, in the Nursery & Tissue Culture subject it was stated that there was a decrease in student achievement results. Based on school evaluations, it was found that only 15% of students passed the minimum score. From the initial data obtained, it is known that the cause of this decrease in the score is that the existing online learning media is not optimal. During

online learning, the method of providing material handouts and learning videos uploaded on the Youtube site are distributed through class groups on the Whatsapp application. However, it turned out that students could not understand the subject matter properly which caused their test scores not to reach the minimum criteria. Based on this problem, further research is carried out to find out the causes of the conditions experienced to formulate alternative solutions.

The research method used is the Design Thinking method. Data collection was carried out using observation techniques on school visual documents, and interviews with several stakeholders to get a complete picture of the problem from various points of view. The second technique is a questionnaire to find out quantitative data as a follow-up to the interview results that have been obtained. The study results are an alternative online learning media in the form of an android application that suits the needs & conditions of students at SMKN 1 Simpang Empat Tanah Bumbu.

2 Method

The research used is the concept of design thinking. Design thinking is a thought process, thinking ability, innovation or new product development process, problem-solving tools, as well as a step-by-step guide to producing an innovation [1]. The research was conducted through 4 of 5 stages in design thinking [1] as follows:

1. Empathize, this process is the foundation in the design process that focuses on building empathy for humans by emptying oneself as if they don't know anything about users or customers.
2. Define, the define stage is the result of an analysis that reveals the discovery of empathy in the first stage into the form of enlightenment and needs that are interesting and have a specific and meaningful scope.
3. Ideate, this stage is the stage for generating ideas after finding the core problems from the previous stage. At this stage, all possible ideas as solutions to the problem are raised.
4. Prototype, Prototype is the process of converting ideas that have been collected into physical or tangible form. A prototype can take any form in the form of a physical, mock-up, post-it notes, role-play activities, objects, or the form of a storyboard.

In general, 2 stakeholders are the main research data sources, namely Nursery and Tissue Culture subject teachers, and students of class XI & XII majoring in the Food Crops & Horticulture Agribusiness department at SMKN 1 Simpang Empat. Students in these two classes were selected as the study population because they were following the scope of the research, namely those who had carried out the Nursery & Tissue Culture (Vegetative) Culture subject, with a total population of 68 people. Of the total population, a sample of 75% was selected, namely 51 students as the research sample.

3 Result and Discussion

3.1 Results

The empathize step reveals that the purpose of learning Nurseries & Tissue Culture subject at SMKN 1 Simpang Empat is: (1) students can develop curiosity about tissue culture through the process of observing, asking, collecting, processing, and communicating information; (2) students can carry out all practical activities properly and correctly through practical learning. During offline or normal learning, Vegetative Nurseries (Inoculation) require several tools that students can access through the school laboratory. Tissue Culture learning material is divided into 6 stages, namely: Preparing Planting Media, Preparing Planting Material, Planting Material Sterilization, Inoculation, Treatment, and

3.2 Transplant/Acclimatization

Online learning requires the students to prepare tools on their own for Vegetative Nurseries (Inoculation). It does not have to be the same as long as it can function similarly. The only tool that can't be replaced is the Laminar Air Flow Cabinet. Through video tutorials made and uploaded via YouTube by the teacher, students learn how to carry out the stages of a vegetative nursery, then students are assigned to carry out practical activities in groups. To understand the theoretical content of the subject, students are given learning material handouts in Microsoft PowerPoint format. Competency tests are done online through a quiz made by the teacher using Google Form. To organize the material and assignments given, teachers use the Google Classroom platform.

According to the teachers, material handouts and videos are chosen as the main methods so that it is easier for students to understand the material provided while also increasing the desire to study independently. However, the teacher said that the quality of the learning media that was made needed to be further developed due to the limited ability of the teacher to operate digital software. Video meetings have been done and are not reused because they are considered ineffective. Student attendance does not reach 100%, and student activity during the meetings is deficient. The teacher understands the condition of students who have difficulty accessing the internet so the video meeting method is not implemented anymore. From the student's point of view, the problem is in the one-way learning strategy. In addition, students find it difficult to do practical assignments in the form of video documentation due to the limited specifications of the devices that students have.

Questionnaire data also states that as many as 46.2% of students experience poor internet connection or felt that the cost of internet data is expensive. As many as 19.2% of students also stated they did not have a supporting device. This implies that students have economic limitations that affect their learning process during online learning. 100% of the student sample stated that the operating system used is Android. 60% of students have 32GB of internal storage capacity with 2GB of RAM which is relatively

small. 73% of students have difficulty understanding the material provided by the teacher.

Through these data problem identification can be categorized into two points of view in the define step: (1) Students' Problem: Internet Access; Difficulties understanding given learning materials; The one-way learning method is a definite problem; Existing online learning media is not suitable to the student's condition; (2) Teachers' Problem: Student scores do not reach the minimum criteria; Cannot evaluate the competence of the students practice assignments so that the assessments are not objective; Limitations in making a proper online learning media; Existing online learning media cannot support independent learning of students and increase their learning interest. The problem statement can now be formulated as "The need to develop an online learning media on the Plant Tissue subject (Inoculation) that could increase the SMKN 1 Simpang Empat students' interest which is also suitable with their conditions".

Android application is chosen as the solution through the ideate process. It is created using PowerPoint. The design uses the "8 Golden Rules of Interface Design" [3] to create good interface designs in an interactive application. Learning media in the form of interactive multimedia was chosen with the hope of providing multisensory experiences to students in a fun way so that students' interest in learning will be awakened and provide good learning outcomes [1]. PowerPoint was chosen because it is easy to use and uses relatively small memory. MS files. The PowerPoint file then can be converted into HTML format using the iSpring software, which can then be converted into an Android application using the W2APK Software Builder software.

The application designed as an alternative solution is called "INOMARI" which stands for "Inokulasi Mandiri" in Bahasa Indonesia and can be translated to English as "Independent Inoculation". Generally. The "INOMARI" application has the concept of "A fun self-study and device-memory-friendly package, which can be operated without an internet connection". "INOMARI" has 3 main menus, namely: (1) Material; (2) Simulation; (3) Exercise; as well as an additional 1 help menu that contains shortcuts to links to video material (YouTube) and the teacher's Whatsapp chat.

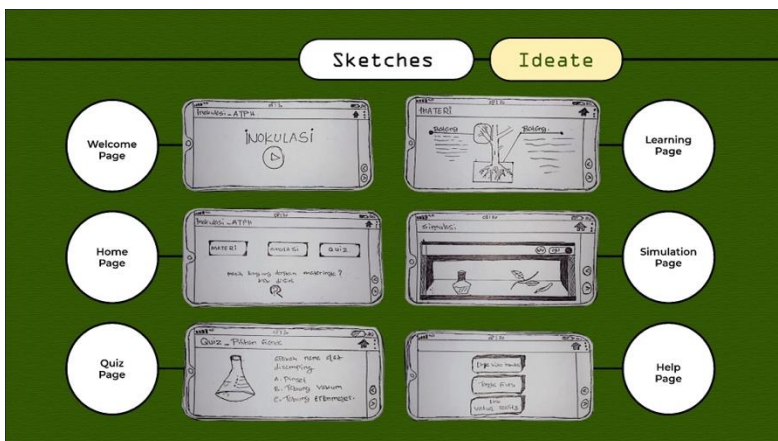


Fig. 1. Sketch

There are 3 types of fonts used in the Inomari application, namely Cooperate Black as the title, and fonts from the Montserrat Family for content. These two types of fonts were chosen because they can give a relaxed impression, but can be read easily so that the process of absorbing information can run well. The color theme used is an organic color theme that represents the Nursery & Tissue Culture subject. Flat design is chosen as the design style because it doesn't take a lot of memory when implemented in the application.

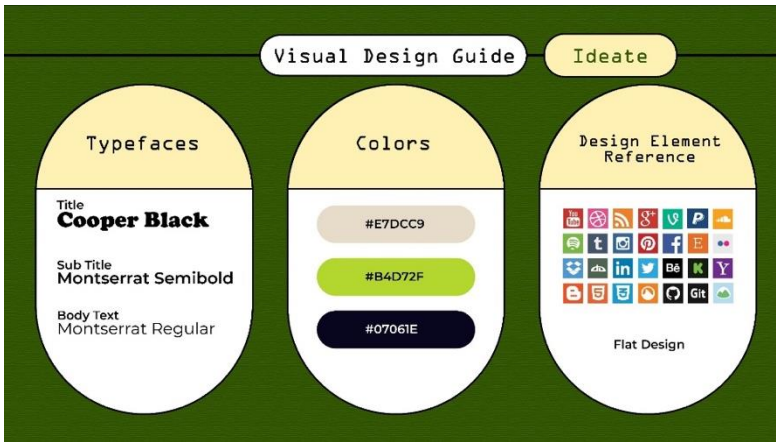


Fig. 2. Design Guide

To increase the usability of an application, it is important to have a good interface design. These 8 golden rules are guidelines for designing good interaction designs, namely: Shortcuts, Feedback, Closing Dialogue, Error Handling, Action Reversal, Content Efficiency, User Control, and Consistency [3].

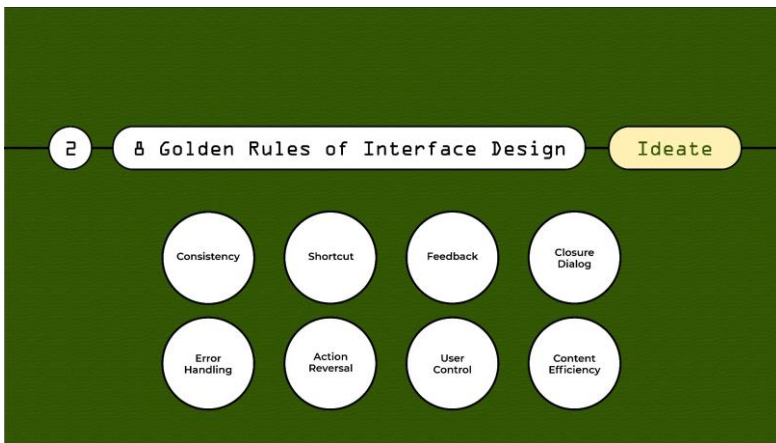





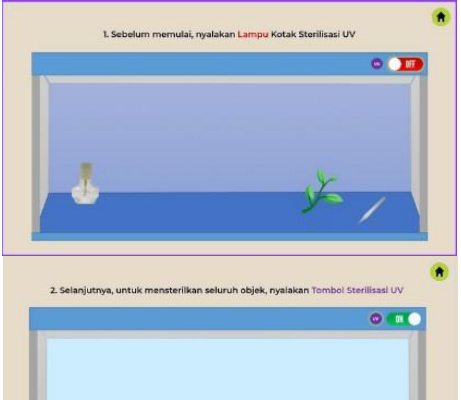

Fig. 3. 8 Golden Rules of Interface Design

The implementation of the "8 Golden Rules of Interface Design" [2] concept in the "INOMARI" application can be explained in the following Table 1:

Table 1. 8 Golden Rules of Interface Design implementation on "INOMARI"

Golden Rules	Description	Inomari App Screenshot
Consistency	Icons, colors, design elements in the application are designed and displayed consistently in a single theme that has been conceptualized. It is intended so that users can quickly adapt to the application.	 <p>The screenshots show a dark blue header with the word 'INOKULASI' and a play button icon. Below it is a light beige screen with the text 'SIAP UNTUK SIMULASI INOKULASI?' and a 'SIAP!' button. The next screen shows three menu items: 'MATERI', 'SIMULASI', and 'LATIHAN', each with a question mark icon. At the bottom, there is a text prompt: 'Masih bingung dengan materinya? Klik disini!' with a question mark icon.</p>
Shortcut	There are 3 shortcut buttons embedded in some of the application content pages, such as the back, home, and question mark buttons. This button functions as a shortcut key when the user wants to quickly return to the previous page, the main menu, or access a help feature.	 <p>The image shows three circular buttons with a light green background and a dark green border. From left to right, they contain a black left-pointing arrow, a black house icon, and a black question mark.</p>

Golden Rules	Description	Inomari App Screenshot
Feedback	<p>Feedback is a response given to users to reassure them in deciding their choices when interacting with a button. Several examples of this feature exist after interaction with the simulation button and practice.</p>	
Closure Dialog	<p>The closure dialog is useful on the final page after the user has successfully followed a set of actions by the app's design and is progressing to the next stage. The closure dialog in this application is at the end of each session at the end of each main menu.</p>	
Error Handling	<p>There is a sign (the button turns red) when the user fills in the wrong answer in the Practice menu. This is an indication that the action the user chose was an error, leading the user to "try again".</p>	

Golden Rules	Description	Inomari App Screenshot
Action Reversal	<p>The "Try Again" button is a solution when the user mistakenly answers a question on the "Practice" menu. This feature serves as a user's quick access to immediately repeat and provides an opportunity to improve the answer.</p>	
User Control	<p>In the simulation menu, the application is designed so that the user seems to be "working directly on the inoculation process" which is guided by the dialog commands and symbols in the application.</p> <p>The feature of providing control for users serves to generate user trust in the application.</p>	
Content Efficiency	<p>On the "Material" menu, some material content will only appear if the user presses several terms that contain said material content. This is intended as efficient content displayed at one time so that users can focus on absorbing the material in the application.</p>	

3.3 Discussion

The problems that are gathered from the “empathize” process result in a wicked problem. Some problems contradict each other. For example, the students said that a video conference would be a better option for online learning, on the other hand, the teachers said that it has been done but there are no activities from the students. The students

demand a two-way online learning method but they are very passive when the opportunities arrive. Finding common ground for both parties is the best thing to do to redefine the problem for the next step.

The redefined problem is necessary not only to make clear the problem but also as a guideline for brainstorming the idea for the solution which turned out to be an Android application. There are several methods to design an interface for an application. The 8 Golden Rules by Shneiderman [2] is chosen because it is the most compatible for increasing students' interest in self-learning. Although the application is already finished, the final design of the application needed to be tested further. Feedback from both the teacher and the students as the users is important to know whether the application is solving the problems or not. If it does not solve the problems then the feedback can be used as a tool to improve the design.

4 Conclusion

The learning process During online learning conditions is strongly influenced by the learning media used, especially when implementing self-learning strategies. Learning media will be good if it succeeds in increasing student learning interest in the subject matter. Learning media in the form of interactive multimedia or this case an application can increase student learning interest well. A suitable design plays an important role in making interactive multimedia through good interface design. The "INOMARI" application can be an example of an online learning media model for other tissue culture sub-subjects.

References

1. D. Kelley and T. Brown, "An introduction of Design Thinking," *Institute of Design at Stanford*, 2018.
2. B. Schneiderman, *DESIGNING THE USER INTERFACE*. Washington: Pearson Education, Inc., 2005.
3. R. Anita, "Pengembangan Media Pembelajaran Teks Anekdot Berbasis Animasi Pada Siswa Kelas X Sekolah Menengah Kejuruan," Prodi Magister Pendidikan Bahasa dan sastra Indonesia, Universitas Lampung, Lampung, 2016.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

