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Interactive Media Application for Banana Cultivation Among Farming Groups at Rajabasa Lama 2 Village

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Abstract: This research project aims to develop an interactive media application to enhance the knowledge and skills of banana cultivation among farming groups in Rajabasa Lama 2 Village. The development approach utilized the MDLC (Multimedia Development Life Cycle) method, with a specific focus on the implementation phase. The application has been meticulously designed to facilitate effective learning and tailored to the specific needs of the local farming community. The results of the implementation phase have demonstrated a positive impact on both productivity and the understanding of banana cultivation within the farming groups. Consequently, this application makes a valuable contribution to the advancement of sustainable agriculture at the village level.

Keywords: Learning Guide; Interactive Multimedia; Cultivation.

1. Introduction

Banana cultivation plays an important role in supporting food security and increasing farmers' income in various countries, especially in tropical areas. Banana trees have enormous potential to produce abundant harvests, but their cultivation requires special knowledge and skills for good maintenance and management [1]. In addition to being an important source of nutrition, bananas are a staple crop for many communities, contributing to their economic stability and overall well-being. In rural areas in Indonesia, such as Rajabasa Lama Village 2, agriculture is the main livelihood. Banana cultivation is a key component of this sector. However, there are several challenges that continue to confront farmer groups in this village. One of the main obstacles they face is limited access to technical information regarding effective and sustainable banana cultivation practices. Lack of understanding of best practices can hinder their harvest potential and negatively impact the quality of their products [2].

Additionally, technology and interactive media have become integral components of everyday life, revolutionizing the way information is accessed and shared. Unfortunately, the farming community in this village has not fully utilized these resources to support their cultivation efforts. Therefore, the development of interactive media specifically designed to facilitate learning and exchange of information about banana cultivation could offer a transformative solution. By integrating technology and interactive media into their traditional farming practices, these farming groups can increase their knowledge, share experiences, increase crop yields, and not only improve the welfare of local farming communities but also contribute to regional food security, increasing product yields and increasing productivity. quality, and encourage sustainable development in the agricultural sector [3].

In this research, there is a need for innovative efforts to bridge the knowledge gap that is hampering the progress of banana cultivation in Rajabasa Lama Village 2. This research aims to determine the feasibility and impact of implementing an interactive media platform specifically designed for agricultural education. By providing accessible, relevant and up-to-date information on banana cultivation practices, this initiative aims to empower local farmers with the knowledge and tools they need to increase productivity and ensure food security for the entire community. Through collaboration with

local agricultural experts and harnessing the potential of technology, we aspire to create sustainable and impactful solutions that address the unique challenges facing banana farmers in the region. This research not only recognizes the importance of banana cultivation in supporting livelihoods and food security, but also recognizes the technology's potential to drive positive change in agricultural practices. By addressing the specific needs of Rajabasa Lama 2 Village, we hope to create a model that can be adapted and scaled to benefit banana farmers in similar rural communities, ultimately contributing to the sustainable development of the agricultural sector in Indonesia and beyond.

2. Research Method

2.1. Data Collection Method

Data collection is an essential step in obtaining the necessary information to achieve the research objectives. Prior to commencing the research, a researcher typically formulates hypotheses based on the underlying theories. These hypotheses serve as the foundation to direct the research, and to empirically test their validity, detailed data collection is imperative. The data collection process is influenced by the variables identified within the hypotheses. Pre-determined samples become the objects of data collection. In this context, data is defined as information that lacks meaning to the receiver and requires processing stages. Data can take various forms, including images, sounds, text, numbers, language, symbols, and even specific conditions. All these elements are considered data as long as they can be employed as material for analyzing the environment, objects, events, or specific concepts.

2.2. Research Procedure

This research applies a methodology that leverages the stages of Multimedia Development Life Cycle (MDLC), which consists of six stages:

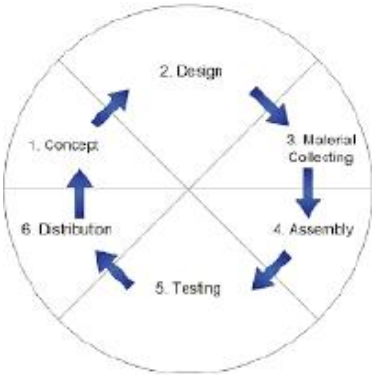


Figure 1. MDLC concept

1) Concept
   In the concept stage, the first step involves setting objectives and identifying the program's users (audience recognition), the type of application to be developed, the specific goals of that application, and the general specifications required. This stage also establishes the basic design rules, such as application size parameters, target users, and other aspects that guide the overall application design process.
2) Design
   Design is an essential stage in the development of the application, where detailed specifications regarding the architecture of the application, style, appearance, and material/resource requirements are created. These specifications are designed in such a way that during the subsequent stages, such as material collecting and assembly, no new decisions need to be made. Instead, this stage can follow the guidelines established during the design phase. However, it is not uncommon for additions, deletions, or changes to be made to the material or parts of the application in the early stages of project work.
3) Material Collecting
   Material collecting is the process of gathering materials that are relevant to the ongoing project's needs. These materials involve clip art, images, animations, videos, audio, and other resources that can be obtained either for free or through orders from external parties in accordance with the project plan. This step can be conducted simultaneously with the assembly phase, ensuring the availability of all necessary materials as the assembly process proceeds.
4) Assembly
   The assembly phase is the process of creating all multimedia objects or materials, conducted after the design phase is complete. During this stage, the application is constructed with reference to storyboards, flow diagrams, and navigation structures that were determined during the design process.

5) Testing
After the application's construction is completed, the next step is to conduct testing to evaluate the application's capabilities and performance. During this stage, a thorough review (recompile) of the application is performed to ensure that all links, buttons, and other features function properly as expected.
6) Distribution
In this stage, the application is archived on a storage medium, which is often referred to as the evaluation of the finished product to enhance its quality. This evaluation yields results that can be utilized as constructive input for the concept design stage of the next product.

3. Result and Discussion

3.1 Results
3.1.1. Data Collection Method
1) Interview Method
The interview method involves direct oral question-and-answer interactions with respondents. The researcher conducted interviews with farming groups aimed at the targeted distribution of the interactive media application. Subsequently, the researcher conducted interviews with banana farmers to gain insights into banana cultivation, which served as the source of information for the development of this interactive media application.
2) Observation
Observation is a crucial method in this research, aimed at understanding banana cultivation practices, the challenges faced, responses to technology, and farmers' evaluation of knowledge regarding modern farming practices and whether they have received specific education or training. In this context, the researcher will conduct observations of:

Farming groups in Rajabasa Lama 2 Village with the following organizational structure:

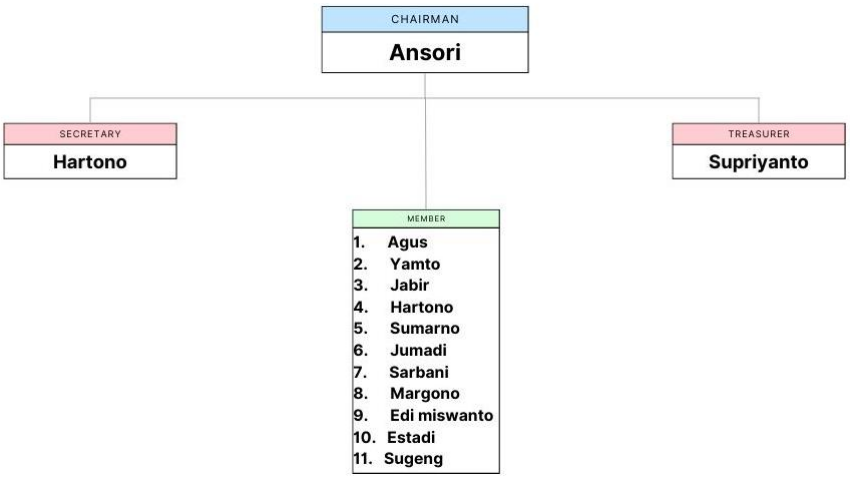


Figure 2. Organizational Structure

Furthermore, the researcher will conduct observations of an expert to gather data related to the proper procedures for conducting cultivation practices. The following are some experts who will be interviewed:

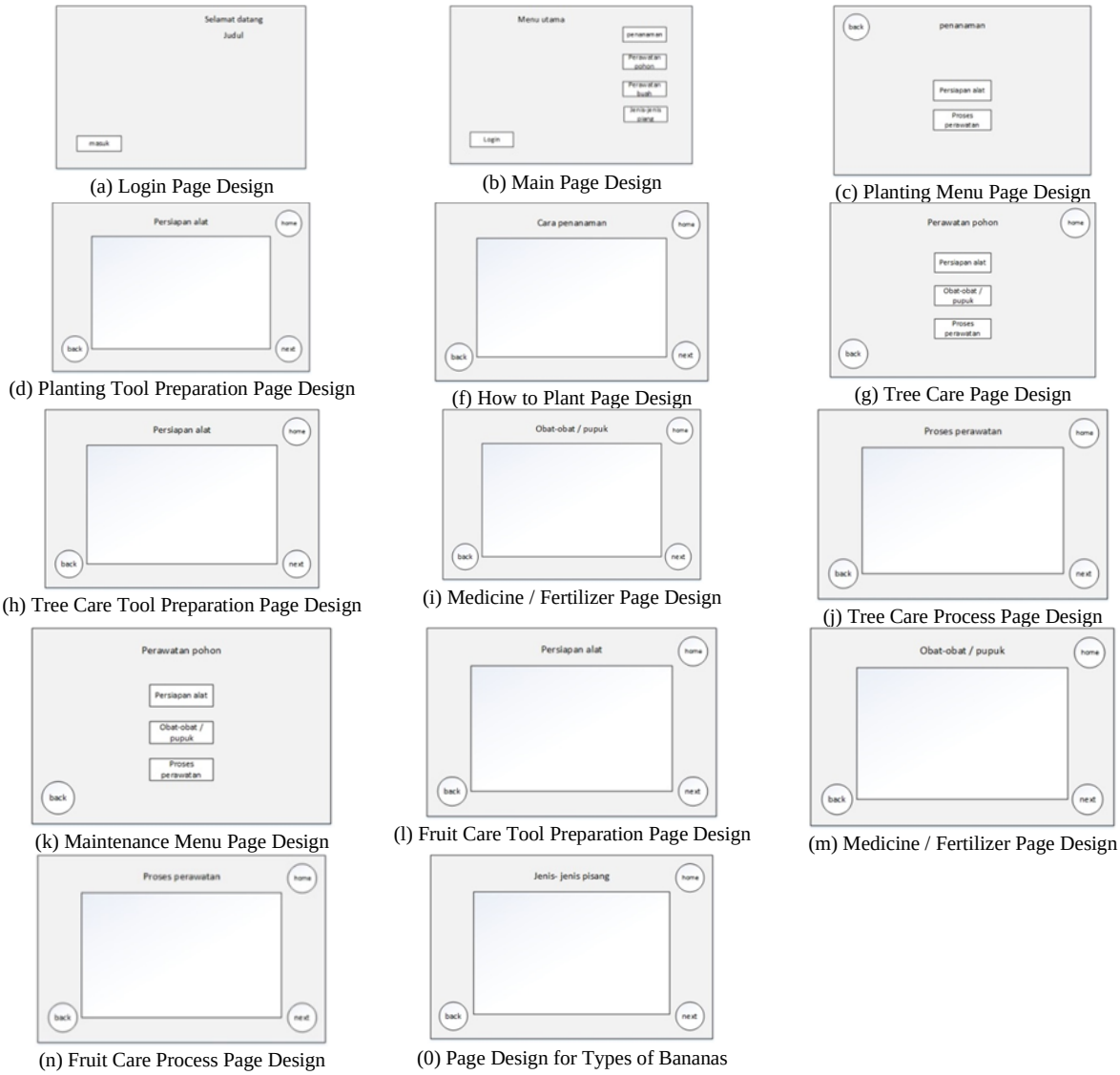
3.2.2. Research Procedure
This research applies a methodology that leverages the stages of the Multimedia Development Life Cycle (MDLC), consisting of six stages:
1) Concept
The interactive media application is intended for farming groups in Rajabasa Lama 2 Village and will be used as a means of introducing the application created. The detailed concept required is as follows:

Table 1. Learning Media Concept

No	Concept	Description
1	Title	Interactive Media Application for Banana Tree Cultivation in Desa Rajabasa Lama 2
2	Objective	To introduce modern agriculture and knowledge of banana tree cultivation to the farming groups in Desa Rajabasa Lama 2 as a knowledge platform for them.
3	Users	Farming groups in Desa Rajabasa Lama 2.
4	Content Source	The content of this application is sourced from journals collected by the researcher.
5	Media Types	Text, audio, images, and animations.
6	Content	Content focuses on the cultivation of banana trees.
7	Image Formats	Images are in JPG, JPEG, and PNG formats.
8	Creation Tool	Developed using Adobe Flash CS6 software and published as an .exe file.
9	Output	The published application is stored on CD/DVD for distribution.
10	Interactivity	The application includes various buttons that navigate menus, submenus, content, and animations. Buttons are used to transition between frames and scenes.

2) Design

Creating the application begins with designing its initial layout, such as the login page, the main menu, material pages, and more. The following details the results of the initial design for the application:



(a) Login Page Design (b) Main Page Design (c) Planting Menu Page Design

(d) Planting Tool Preparation Page Design (f) How to Plant Page Design (g) Tree Care Page Design

(h) Tree Care Tool Preparation Page Design (i) Medicine / Fertilizer Page Design (j) Tree Care Process Page Design

(k) Maintenance Menu Page Design (l) Fruit Care Tool Preparation Page Design (m) Medicine / Fertilizer Page Design

(n) Fruit Care Process Page Design (0) Page Design for Types of Bananas

Figure 3. Design Application

The login page is presented, featuring the title and a button to access the main menu (Figure 3.a). Within the main menu, there are sub-menus including options for planting, tree care, fruit care, and different types of bananas (Figure 3.b). Navigating to the planting page, it offers tool preparation and planting method options (Figure 3.c). This page

provides insights into the preparations necessary for planting and includes navigation buttons like Home, Back, and Next (Figure 3.d). It also explains proper planting techniques and maintains the same navigation button layout (Figure 3.e). Transitioning to the tree care page, it offers tool preparation, medication and fertilizer, and maintenance process options (Figure 3.f). This section elaborates on the preparations needed for tree care and maintains consistent navigation buttons (Home, Back, and Next) (Figure 3.g). Continuing with tree care preparations, this page also includes the same navigation options (Figure 3.h). It covers the entire process from planting to harvest, maintaining the familiar navigation button layout (Figure 3.i). Moving on to the fruit care page, it presents options for tool preparation, medication and fertilizer, and the maintenance process (Figure 3.j). This page focuses on preparing for the fruit care process and features navigation buttons like Home, Back, and Next (Figure 3.k). It further delves into fruit care preparations while keeping the same navigation button layout (Figure 3.l). This section covers the care process for fruit shoots up to the harvest stage, with consistent navigation buttons (Home, Back, and Next) (Figure 3.m). Finally, there's a page dedicated to showcasing various types of bananas (Figure 3.n).

In designing the application, various tools are utilized, including software and hardware:
a. Software
Software is essential for creating interactive media applications. In this case, the author utilized Adobe Flash software for editing, encompassing the design of the user interface, creating buttons, and incorporating video, audio, and animations.

b. Hardware
Several hardware specifications are required for the development of the application, as detailed in the table below:

Table 2. Hardware Specifications

No	Specification	Requirement
1	CPU/Processor	2.5 GHz
2	Hard Disk	500 GB
3	RAM	4 GB
4	Monitor	14 inches
5	Operating System	Windows 10

3) Material Collecting
In the creation of the application, the researcher requires various data, such as clip art, graphics, animations, videos, and audio. Here are some icons that will be used when creating the application:

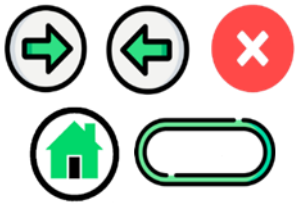
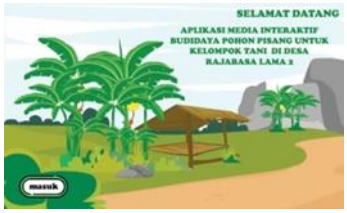
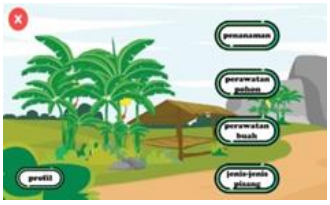


Figure 4. Material Data Collection

4) Assembly
The application's design has been completed, and now the researcher will proceed with creating the application using Adobe Flash CS6. The following details some of the application creation processes:



(a) Homepage



(b) Main Menu Page

(c) Planting Menu Page

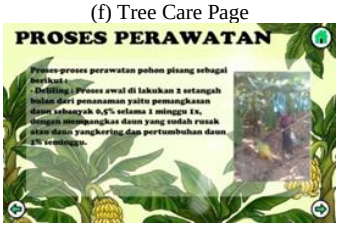
(d) Planting Preparation Page

(e) How to Plant Page

(f) Tree Care Page

(g) Tree Care Tools Preparation Page

(h) Medicines / Fertilizer Page



(i) Tree Care Process Page

(j) Fruit Care Menu Page

(k) Fruit Care Tool Preparation Page

(l) Medicines / Fertilizer Page

(m) Fruit Care Process Page

(n) Page Types of Bananas

Figure 4. Assembly View

This page features a title and a menu button for accessing the main menu (Figure 4.a). Within the main menu, there are sub-menus, including options for planting, tree care, fruit care, and types of bananas, all of which provide detailed content (Figure 4.b). Moving to the planting page, it offers sub-menus for planting preparation and planting methods, providing a comprehensive guide to planting banana trees (Figure 4.c). This section covers tool preparation, planting materials, and includes navigation buttons like Home, Back, and Next (Figure 4.d). Additionally, it explains the proper planting process with the same navigation button layout (Figure 4.e). Transitioning to the tree care page, it offers various sub-menus such as tool preparation, medicines/fertilizers, and the care process, explaining the entire tree care process from planting to harvest (Figure 4.f). This section details the preparation of necessary tools and maintains navigation buttons (Home, Back, and Next) (Figure 4.g). It also covers material preparation for caring for banana trees while keeping the navigation button layout consistent (Figure 4.h). Furthermore, it explains the correct and proper way to care for banana trees and includes navigation buttons (Home, Back, and Next) (Figure 4.i). Moving on to the fruit care page, it includes sub-menus for tool preparation, medicines/fertilizers, and the care process, providing insights into fruit care until harvest (Figure 4.j). This page focuses on the readiness of tools needed for maintenance and includes navigation buttons like Home, Back, and Next (Figure 4.k). It also explains the preparation of medicines and fertilizers for fruit care while maintaining navigation buttons (Home, Back, and Next) (Figure 4.l). Additionally, it covers the care of fruit buds until harvest with the same navigation button layout (Figure 4.m). Lastly, there's a page dedicated to showcasing various types of bananas (Figure 4.n), featuring navigation buttons such as Home, Back, and Next.

5) Testing
The testing phase is crucial to identify errors and malfunctioning features within the application. Common issues include bugs, incorrect button functions, interface design errors, and incorrect application performance.
6) Distribution
After following the creation procedures, the application will undergo the publication process, which will transform it into an .exe file. Subsequently, it will be stored on a CD/DVD for distribution to farming groups in Rajabasa Lama 2 Village.

3.2 Discussion

In this section, research procedures will be discussed, especially with a focus on the Multimedia Development Life Cycle (MDLC) stages and their implications for the development of interactive media applications for banana tree cultivation in Rajabasa Lama Village 2. The MDLC stages play an important role in shaping the design and functionality of the application. The concept stage is a fundamental stage because this stage sets goals and identifies the target audience for the application. In this case, the main objective is to introduce knowledge of modern agriculture and banana tree cultivation to farmer groups in Rajabasa Lama Village 2. By determining the content source and type of media, we ensure that the implementation is in line with the research objectives. In addition, the concept stage allows us to determine the level of interactivity of the application, which has proven to be important for effectively engaging users. Design is where the visual and structural aspects of an application are created. The initial layout, including the main menu and content pages, was designed with user experience in mind. By adhering to the design rules and specifications established at this stage, we aim to create a smooth and intuitive interface for the user. Utilizing software such as Adobe Flash facilitates the design process, and hardware specifications ensure smooth development. Collection of materials, such as clip art, graphics, animation, video, and audio, is essential to enrich the application content. This stage runs parallel to assembly, ensuring that all the necessary materials are available. The choice of materials has a significant impact on the overall quality and completeness of the application, thereby increasing its effectiveness as an educational tool. The assembly phase is when the application comes to life. Detailed design specifications provide a clear roadmap for this stage, minimizing the need for on-the-fly decision making. This allows for a smoother development process, and adherence to design guidelines ensures consistency across applications. The use of Adobe Flash as development software facilitates the incorporation of multimedia elements, making applications attractive and informative. Testing is an important phase to identify and fix any errors or issues in the application. This involves a comprehensive review to ensure that all features, buttons, and interfaces work as they should. Thorough testing is essential to deliver a flawless and error-free product to end users. Any bugs or interface design weaknesses detected during this stage can be addressed efficiently. The final stage involves archiving the application and preparing it for distribution. The application is converted into an .exe file so that it can be accessed by the user. By saving it on CD/DVD to be distributed to farmer groups in Rajabasa Lama 2 Village, we ensure that the knowledge and insights obtained from the research reach the intended audience effectively. MDLC's systematic approach to stages guided the development of the interactive media application, ensuring that it met the goal of disseminating knowledge of modern agriculture and banana tree cultivation to farmer groups in Rajabasa Lama Village 2. Careful consideration at each stage contributed to the overall quality and effectiveness of the application, making it a valuable tool for improving agricultural practices and dissemination of knowledge in target communities.

4. Related Work

Various studies have produced findings and methodologies that contribute to the development of interactive media applications, several relevant studies, and contributions such as those carried out by Anwar and Sutomo (2023) focus on the application of the C4.5 algorithm in classifying job relevance among alumni. Although their studies may seem unrelated at first glance, the use of algorithms for classification is the common thread [4]. Likewise, Saprudin and Setiawan (2023) explored the analysis of increasing sales through advertising media created using applications. This study emphasizes the role of media in conveying information effectively, a related aspect in developing interactive media for agricultural education [5]. Salampessy, Suherna, and Meilani (2020) explored organic fertilization for sustainable cocoa cultivation. Although the focus is on different crops, the concept of sustainable agricultural practices is applicable and in line with the goal of promoting modern and sustainable agriculture in this research [6]. In addition, Ratnasari, Fitriawan, and Miftahudin (2022) facilitated goat farmers in making compost, emphasizing community involvement and dissemination of knowledge, like the aim of implementing interactive media [7].

Ridwansyah, Edi, and Widiastuti (2021) discuss the processing of various banana flavors and digital marketing to improve the economy of a village. This study touches on aspects of agricultural economics and marketing, which may be relevant to the potential impact of its implementation on increasing the income of local farmers [8]. Furthermore, Nopita, Sujadmi, and Febriani (2020) explored women's empowerment in farmer groups, highlighting the importance of community involvement and empowerment, which is a key aspect of the expected benefits of the application [9]. Susanti *et al.* (2022) provides technical guidance on organic banana cultivation, in line with the research objective of providing knowledge to farmer groups [10]. Likewise, Lusia *et al.* (2023) utilized moringa leaves and banana peels to increase aloe vera productivity, showcasing innovative agricultural practices that can be incorporated into application content [11]. Adenugraha, Arinal, and Mulyana (2022) worked on banana ripeness classification using image analysis, which is closely related to the technological aspects of its application. Their approach can inform the incorporation of image analysis techniques in applications for better understanding and monitoring of banana trees [12]. Wibowo, Lestari, and Rahayu (2022) present a local wisdom-based empowerment model in banana centers, providing a valuable framework for community involvement and knowledge sharing [13]. Mujriati *et al.* (2021) offers training in hydroponic vegetable cultivation as a means of community empowerment, highlighting the importance of practical education in agriculture

[14]. Rizqi *et al.* (2023) explored branding and online marketing with community organizations and SMEs, emphasizing the role of branding and online presence in promoting agricultural products [15].

This research is an innovative and comprehensive approach to overcoming the challenges faced by the banana farming community in Rajabasa Lama Village 2. What differentiates this research from previous research is its focus on developing interactive media applications specifically designed to facilitate learning and information exchange. in banana cultivation. While there has been research related to agriculture, community engagement, and technology, this research uniquely combines these elements to create practical solutions to improve agricultural knowledge and practices. In contrast to previous studies that explored theoretical aspects or specific agricultural techniques, this research integrates technology and interactive media into traditional agricultural practices. The application developed in this research serves as a knowledge platform for farmer groups, allowing them to access valuable information regarding modern and sustainable banana cultivation. This is more than just providing information; it offers a user-friendly interface, multimedia content, and interactive features that effectively engage and educate the target audience. In addition, the research methodology used in this research utilizes the Multimedia Development Life Cycle (MDLC) stages to ensure systematic and efficient development of interactive media applications. This approach provides a structured framework for designing, gathering materials, assembling, testing, and distributing applications. By following the MDLC stages, this research ensures that the final product is not only informative but also well-designed, user-friendly, and technically sound. In addition, this research also includes elements of community involvement and empowerment, taking inspiration from previous research which emphasizes the importance of involving local communities in agricultural initiatives. This research not only aims to disseminate knowledge but also to empower farmer groups in Rajabasa Lama 2 Village to control their agricultural practices, increase crop yields, and contribute to regional food security and sustainable development. What differentiates this research from previous research is its holistic approach in overcoming the challenges of banana cultivation by creating customized interactive media applications. It bridges the gap between traditional farming and modern technology, providing practical and accessible solutions to the farming community. Utilization of the MDLC framework and emphasis on community involvement makes this research a comprehensive and impactful initiative to improve banana cultivation practices.

5. Conclusion

The purpose of this application is to enhance the knowledge and skills of the farming groups in banana tree cultivation. The MDLC method may refer to an approach or process involving stages of analysis, design, development, and evaluation to ensure the effectiveness of the application. With the interactive media incorporated, it is anticipated that the application will provide easily digestible information, interactive accessibility, support effective learning, and facilitate communication and information exchange among the farming groups. In conclusion, this application is expected to be a valuable tool in improving the productivity and understanding of banana tree cultivation in Desa Rajabasa Lama 2. The application's design aims to create an application that aligns with the needs and characteristics of the farming groups. The design should consider interactivity, accessibility, and information clarity to ensure success in enhancing the knowledge and skills of banana tree cultivation among the farming groups in Desa Rajabasa Lama 2. This conclusion emphasizes the special attention given to design planning to make sure the application can be effectively utilized by the intended farming groups. The implementation of this application is anticipated to provide significant benefits in improving the understanding and skills of banana tree cultivation among the farming groups, along with efforts to support sustainable agricultural development at the village level. The MDLC approach serves as the foundation to ensure that the application can adapt to evolving needs and deliver long-term positive impact. This method has assisted in ensuring that the application is not only created considering the needs of the farming groups and the local characteristics of Desa Rajabasa Lama 2 but is also effectively implemented.

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