

### CHAPTER III

## RESEARCH METHODOLOGY

In this chapter, the writer explains the project design, incorporating relevant theoretical frameworks, and project development process.

#### A. Research Design

The COPTAS application development followed the ADDIE model, which represents the stages of the development process: analyze, design, develop, implement, and evaluate. This model provided a structured framework to ensure comprehensive planning and execution of the project phases. According to Branch (2008, p. 2), ADDIE is a concept used in product development that provides guidance for complex situations, especially in creating educational products and learning resources. The ADDIE model encourages practical, versatile, context-specific, and motivating learning methods. Below is the COPTAS development process based on the ADDIE approach:

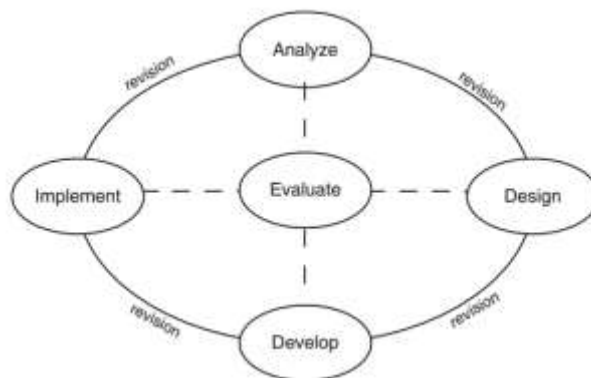


Figure 3. 1 The ADDIE concept

## **B. Project Time and Location**

This model enabled the writer and team to methodically address every project phase, ensuring thorough consideration and execution of all aspects. In the following sections, each phase of the ADDIE model will be explored in the context of developing the COPTAS application.

### **1. Analysis**

In the analysis phase, this involves identifying the needs and requirements of the project in depth, ensuring that all aspects necessary for the development of the application have been properly considered. Information was gathered through intensive team discussions to understand the main problems faced by coffee farmers related to leaf diseases. By comprehensively understanding the needs and challenges faced by farmers, the team was able to formulate the right solution in developing this application.

### **2. Design**

In the design phase, the writer and team created a comprehensive project plan, including the creation of a detailed system architecture and user flow. This design aims to ensure smooth interaction between the different parts of the application and provide an excellent user experience. The user flow is designed to guide users through each step in the application easily and intuitively, while the overall structure is designed to support reliable and efficient application performance.

### **3. Development**

The development phase focuses on the actual creation of the application, including coding the user interface and building the application based on the design specifications that have been made. Machine learning models are developed and trained using previously collected data to ensure the accuracy and effectiveness of the disease identification process. Each component of the application is carefully developed to ensure that all features operate correctly and meet the specified requirements.

### **4. Implementation**

At this stage, the application is integrated and thoroughly tested to ensure that all components work together smoothly. The trained machine learning models are deployed to the cloud, enabling efficient and immediate utilization. In addition, a connection is established between the application and the backend server to ensure stable and responsive operation. Testing is performed to detect and fix any bugs or issues that may arise during application operation.

### **5. Evaluation**

The evaluation phase involves testing the product both internally and externally and compiling complete application documentation. Testing is conducted by the development team and users to evaluate the functionality, performance, and overall coordination of the application. The feedback obtained from this testing is used to make additional enhancements before

the application is launched. In addition, documentation covering all aspects of the application is compiled to ensure that the application can be maintained and enhanced in the future, as well as making it easier for users to understand how the application works and its overall benefits.

### **C. Product Based Project Validation Phase**

#### **1. Project Plan Submission**

Initially, the writer and team will create a project plan following Bangkit Academy's guidelines. The project plan should encompass key elements like an executive summary, project scope, schedule, tools/resources, and development components such as machine learning, application development, and risk management.

#### **2. Assessment by Bangkit Academy**

Once the project plan is ready, the writer and team submit it to Bangkit Academy for assessment. The Bangkit Academy team will review and evaluate the proposed project plan. This evaluation includes an assessment of the feasibility, clarity and suitability of the project plan with the goals and criteria set by the program.

#### **3. Revision and Approval**

Based on the assessment results, Bangkit Academy will provide the necessary feedback and recommendations. The writer and team will then proceed to make revisions to the project plan based on the feedback provided. Once revisions are completed, the project plan undergoes resubmission for final approval.

#### **4. Project Approval**

The approved revised project plan from Bangkit Academy serves as the foundation for proceeding with the project development process. With this approval, the writer and team can proceed to the next stage in project development according to the approved plan.

#### **D. Product Trial**

The trial phase of the COPTAS project is divided into two, namely:

##### **1. Internal Trial Phase**

At this stage, trials were carried out within the scope of the development team and writer of the COPTAS project. Team members will thoroughly test the project to assess how well the application works, its speed, and how different parts of it work together. The feedback collected at this stage will help improve the project before it is shown to external parties.

##### **2. External Trial Phase**

At this stage, the COPTAS project will be presented in front of mentors and other teams in the Presentation and Peer Evaluation Meeting. In this session, evaluations are carried out by mentors and participants from other teams, who will provide feedback and assessment of the application. This includes evaluating its feasibility, effectiveness, and user experience. The results of this evaluation will be used to assess the application and evaluate the writer and team.