

CHAPTER III

RESEARCH METHODOLOGY

This chapter explores the research method used in this study, including research design, model of development, procedure of development, research subject, technique, research instrument, data collection technique, data collection instrument, and data analysis technique.

A. Research Design

This study employs a Research and Development (R&D) design aimed at designing, developing, and evaluating an instructional product, namely, augmented reality-based media to support students' speaking skills. According to Sugiyono (2013), research and development is a method used to produce specific products and to examine their effectiveness for application in educational contexts. In addition, Borg and Gall (1983) explain that research and development focus on the systematic process of developing and validating educational products through a series of stages, including product design, development, and evaluation. Besides, research and development based instructional media development significantly improves the quality and practicality of digital learning tools in the classroom (Hidayat et al., 2021). Therefore, this study is not only concerned with producing the learning media but also with ensuring their quality, practicality, and appropriateness for students. The evaluation in this study focuses on how developed

media facilitate students' speaking activities, especially in supporting their confidence and fluency during the learning process.

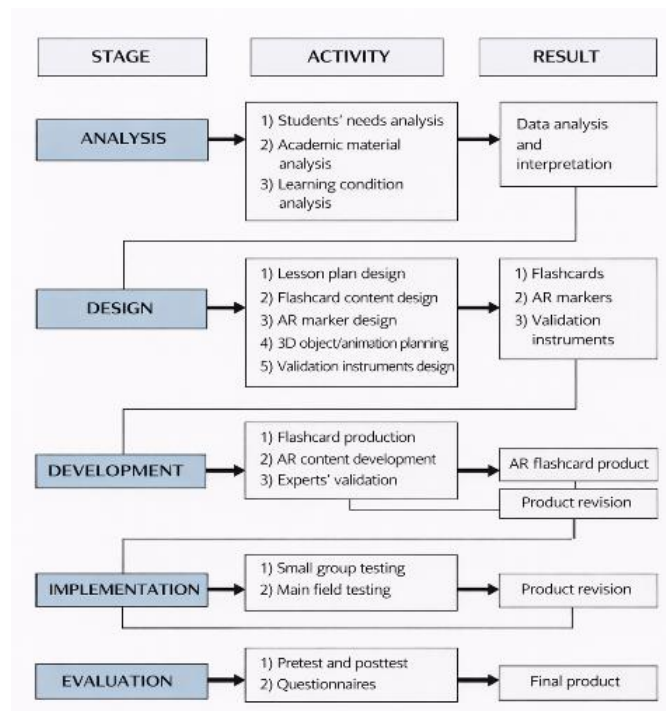
To achieve these objectives, this study uses the ADDIE development model, which consists of five main stages, namely analysis, design, development, implementation, and evaluation. The ADDIE model is a systematic, effective, and flexible learning design model widely used in the development of learning media because it provides structured guidance from planning through evaluation (Almelhi, 2021; Abuhassna et al., 2024; Adeoye et al., 2024). In this study, the ADDIE model was applied as a guideline for designing, developing, and evaluating augmented reality-based learning media to meet students' needs and to achieve the objective of improving their speaking skills.

B. Model of Development

The researchers used the ADDIE model proposed by Branch (2009), which consists of five stages, namely analysis, design, development, implementation, and evaluation. This model was chosen for its systematic, precise approach to developing Augmented Reality-based learning media to improve students' speaking skills (Arochman et al., 2024). In the analysis stage, the researchers identified the needs, student characteristics, and relevant materials. The design stage included the concept, content, and appearance of the augmented reality media. Next, the development stage focused on creating and validating the initial product with expert input. The implementation stage was carried out through limited trials with students

to see their effectiveness and perceptions of the media (Lisnawati et al., 2022). Finally, the evaluation stage was conducted to assess the media's feasibility and effectiveness, and to provide a basis for product refinement and recommendations for further research.

Figure 3.1 The Flowchart of the ADDIE Model



C. Procedure of Development

The development procedure in this study follows the ADDIE Model, which comprises five main stages: analysis, design, development, implementation, and evaluation. Each of these stages is carried out systematically to ensure that the augmented reality-based learning media developed are effective, relevant, and suitable for supporting speaking activities in English language learning. In the

analysis stage, the researcher identified the needs and problems of eighth-grade students at MTsN 1 Kota Kediri regarding English-speaking skills. This activity was initially carried out through observation to identify common difficulties, such as a lack of fluency, limited vocabulary, and confidence issues. It was followed by a questionnaire to identify students' learning needs and a pre-test to assess their speaking ability. The results of this analysis served as the basis for determining the learning objectives and the material to be included in the augmented reality media.

Subsequently, the design stage involved developing the concept for the *iSpeak* media, including visual display design and interactive elements that support speaking activities. At this stage, the researcher designed the overall concept of the media, including the layout of the flashcards, topic selection, and integration of speaking activities. The visual design of the flashcards was created in Canva, with clarity, attractiveness, and relevance to students' levels in mind. In addition, the researcher planned the augmented reality components, including markers, three-dimensional objects, and contextual designs that would appear when the flashcards were scanned. The speaking activities were carefully designed to align with key performance indicators, particularly students' confidence and fluency, ensuring that the media directly supports speaking practice. Furthermore, validation instruments were also prepared at this stage to guide the implementation and evaluation processes.

Following the design phase, the development stage involved creating the *iSpeak* media based on the previous design. The researcher developed the

augmented reality components using Assemblr Edu, integrating 3D objects, animations, and contextual scenes into an interactive system accessible by scanning the flashcards. The printed flashcards and augmented reality markers were finalized and tested to ensure proper functionality. After the prototype was completed, expert validation was conducted involving both a material expert and a media expert. The material expert evaluated the relevance, accuracy, and appropriateness of the speaking content, while the media experts assessed the design, usability, and technical quality of the media. Based on the experts' feedback and suggestions, revisions were made to improve the media's quality, clarity, and usability before it was implemented in the classroom.

Once the media had been validated and refined, the implementation stage was conducted in two phases included small-group testing and main field testing with eighth-grade students at MTsN 1 Kota Kediri. In the small-group testing phase, the media was implemented with a limited number of students to identify initial weaknesses, technical issues, and students' initial responses to the *iSpeak* media. At first, the teacher explained how to use the media, including how to scan the flashcard to access the augmented reality features. The results of this phase were used as a basis for revising and improving the media before broader implementation. Subsequently, in the main field test, the revised media were implemented in a larger classroom to examine their performance in real learning conditions. Students participated in speaking activities, particularly practicing asking and giving opinions using the media. During this stage, the researcher

observed students' participation, interaction with the media, and their speaking performance, especially in terms of confidence and fluency. Field notes and observational data were collected to evaluate how effectively the media facilitated speaking practice.

Finally, to determine the overall quality of the developed product, an evaluation stage assessed the media's effectiveness. This phase involved analyzing data obtained from classroom observations and students' responses after using the media. A questionnaire was distributed to gather students' feedback regarding the ease of use, attractiveness, and usefulness of the *iSpeak* media in supporting their speaking activities. The questionnaire results and observations were used to determine whether the media were appropriate, practical, and beneficial for the classroom. In addition, this stage provided a basis for final revisions and improvements to the product, as well as recommendations for future implementation and further research on augmented reality in speaking instruction.

The last stage is the evaluation step, which assesses the effectiveness of the developed media. After implementing this augmented reality-based media in speaking-learning activities, the researchers distributed questionnaires to students to assess their responses and satisfaction with its use. Based on the questionnaire results and findings from the implementation stage, the researchers concluded that the augmented reality media developed to support the improvement of students' speaking skills were high-quality, effective, and suitable.

D. Subject of the Research

The subjects in this study were students at MTsN 1 Kota Kediri, located at Jl. Raung No. 87, Bandar Kidul, Mojoroto, Kediri, East Java 63118. The participants in this study were 30 students from class VIII-C. Based on the researcher's preliminary research, the students still struggled with speaking English, especially in terms of confidence and fluency. Therefore, this study focused on the development of augmented reality-based learning media designed to improve students' speaking skills, increase their enthusiasm, and maintain their confidence in communicating in English.

E. Technique and Research Instrument

In this study, researchers used several data-collection techniques appropriate to the research objectives and the ADDIE development model. The data collection methods used consisted of observation and questionnaires.

F. Data Collection Technique

1. Observation

The observation was conducted at the beginning of the research, specifically during the analysis phase, to obtain an initial overview of the English language learning conditions in class VIII at MTsN 1 Kota Kediri. This observation aims to identify students' difficulties in the learning process, specifically in their confidence and fluency in speaking English. Based on the

observation results, students still experience difficulties in choosing and using appropriate vocabulary when speaking and frequently pause or hesitate when delivering sentences. This condition indicates that students need learning media that can help them improve their speaking skills, especially in these two aspects. Therefore, the results of this observation serve as the basis for the researcher to develop learning media that are relevant to students' needs and can effectively and meaningfully improve students' speaking abilities.

2. Questionnaires

Questionnaires were given to students before and after the implementation of learning using the developed augmented reality-based media. The purpose is to obtain data regarding the preliminary study and students' responses and perceptions of the learning media. This questionnaire contains questions that assess students' difficulties with speaking English, their media appearances, ease of use, content relevance, and the benefits of media for improving students' speaking abilities. The questionnaire results were analysed quantitatively to determine students' abilities and the feasibility of the learning media based on student responses.

G. Data Collection Instrument

The research instrument is a tool used to collect data in research. In line with this, Sugiyono (2024) also states that the research instrument is a tool used by researchers to observe the problem under investigation. There are two types of

instruments used namely observation sheets, student questionnaires, and expert validation sheets.

1. The Observation Sheet

The observation sheet is used in the analysis stage to obtain initial data on the conditions of English language learning in class VIII-C at MTsN 1 Kota Kediri. This observation is conducted to determine students' difficulties with speaking English and the learning situation in place. This observation sheet is used to assess the practicality of the media (Sadewa et al., 2020). The observation score consists of three levels, namely: Level 3 = High Score, Level 2 = Moderate Score, and Level 1 = Low Score.

Table 3.1 The List of Students' Indicators during English Learning

Number	Criteria	Level		
		1	2	3
1.	Students' learning process in English subjects.			
2.	Students' interest in speaking skills for learning English.			
3.	The students learn English, especially speaking skills, in the classroom.			
4.	Students give arguments about the importance of speaking skills in learning English.			
5.	Students feel bored when studying English in the classroom.			
6.	Students' memories of the material the teacher delivered.			
7.	Application of the English language learning in the school environment.			

Source: (Ningsih et al., 2022)

2. Questionnaire

In this study, the researcher used two questionnaires to collect data on students' conditions and responses. The first questionnaire was used to determine students' needs before using augmented reality-based learning media, and the second questionnaire was used to identify students' perceptions of using the media after learning was complete. These two instruments are based on the theory of Hutchinson and Waters (1987), which considers needs analysis a continual process conducted before and after learning to understand target and learning needs.

The first questionnaire was administered during the analysis phase to identify students' difficulties. The data obtained from this questionnaire will serve as the framework for developing learning media appropriate to students' needs.

Table 3.2 The Blueprint of Students' Questionnaire for Need Analysis

Aspect	Purpose of the Questions	Item Number
Necessities	To identify the speaking aspects that students consider most important and most needed to improve their speaking ability.	1, 2, 3
Difficulties	To identify the students' difficulties and weaknesses in speaking English.	4, 5, 6
Interests	To determine students' priority for improvement and their expectations regarding speaking practice in class.	7, 8, 9

Subsequently, the second questionnaire was presented after the students used the augmented reality-based learning media. The purpose was to

determine students' perceptions, experiences, and evaluations of the media's effectiveness in improving their English language learning.

Table 3.3 The Blueprint of Students' Perception Questionnaire

Aspect	Purpose of the Questions	Item Number
Input	To find out students' perceptions of the materials and activities provided through AR media for supporting speaking practice.	1, 2
Procedures	To explore how students experienced the learning process using AR media and how it enhanced their speaking performance.	3, 4
Teacher's Role	To identify the students' views about the teacher's guidance and interaction during AR-based speaking activities.	5
Student's Role	To assess students' engagement, motivation, and confidence when using AR media for speaking activities.	6, 7
Setting	To evaluate the suitability of the learning environment (time, place, and media accessibility) during the implementation of AR media.	8, 9

3. Material Expert Instrument

The next instrument is the Material Expert Instrument. This validation sheet was given to English language material experts at MTsN 1 Kota Kediri to assess the suitability of the media as learning materials. By doing this, researchers can ensure that the developed media aligns with learning objectives and helps meet student needs.

Table 3. 4 Assessment Aspects Instrument for Material Expert

Aspect	Indicator
Curriculum	The suitability of the material with basic competencies

Material	The suitability of the material with the indicator
	The suitability of the material with the learning objectives
	Material coverage
	Material accuracy
	Material attraction
Evaluation	The suitability of the material with the student's situation
	Appropriate and consistent use of language

Source: Christina and Ganing (2021)

4. Media Expert Instrument

The research instrument for media experts was a validation sheet. The paper was intended for media design experts to assess the technical quality and visual appearance of the learning media. The assessment results from the media experts are used to ensure that the developed media is attractive, simple to use, and effective in supporting students' learning process.

Table 3.5 Assessment Aspects Instrument for Media Expert

No.	Aspect	Indicator
1.	Text	Use the appropriate typeface
		Text legibility clarity
2.	Picture	Standard image quality or resolution
		The use of images in media that supports learning
3.	Animation	Proper use of animation
4.	Color	Color
5.	Technical	Ease of using media

Source: Christina and Ganing (2021)

H. Data Analysis Technique

This study employed a mixed-method approach using an embedded design, in which quantitative data served as the primary source of analysis. In contrast, qualitative data supported the interpretation and refinement of the findings. Quantitative data were obtained from expert validation results and user assessment.

Concurrently, qualitative data were gathered through classroom observations and expert feedback on the developed media.

1. Qualitative Data

Qualitative data consisting of the analysis stage and suggestions on the feasibility assessment sheet for *iSpeak*. Learning media products were analyzed descriptively and qualitatively. The data were used as a guide for developing *iSpeak* learning media.

2. Quantitative Data

Quantitative data in this development research include validity data obtained through expert validation and assessment. Validation data from material and media experts were used to determine the product's feasibility. Each aspect is evaluated on a Likert scale. The evaluation result was calculated using the following percentage formula (Sugiyono, 2021; Raharjo et al., 2024).

$$P = \frac{\Sigma X}{\Sigma X_i} \times 100\%$$

Explanation:

P = Percentage score

ΣX = Total actual score

ΣX_i = Total maximum score

The media validity level is categorized based on the following criteria (Nurbaiti et al., 2022; Raharjo et al., 2024).

Table 3.6 The Level of Validity and Criteria

Validity Criteria	Validity Level
80, 01% - 100%	Valid; can be used without revision.
70, 01% - 80%	Fair; can be used with minor revision.
50, 01% - 70%	Less; proposed to be unimplemented because it needs major revision
1% - 50%	Invalid; forbidden to be implemented

In addition, a questionnaire was used to assess students' responses to the *iSpeak* learning media. The data were analyzed using a percentage formula, and the results were interpreted based on the students' response criteria.

Table 3.7 Range Percentage and Criteria

Percentage	Criteria
81% - 100%	Very Good
61% - 80%	Good
41% - 60%	Fair
21% - 40%	Poor
0% - 20%	Very Poor

The data after a qualitative study showed a low proportion of 0% and a high proportion of 100%. These data are then interpreted and categorized based on qualitative criteria.