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Analysis of the Needs for Developing Digital Learning Media to Improve Concept Mastery and Collaboration

Candra Dwinata*, Wulandari Saputri, Meli Astriani

Master of Biology Education, Postgraduate Program, Muhammadiyah University of Palembang, Palembang, Indonesia
*e-mail: candradwinata4@gmail.com

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Abstract: Education is currently one of the most important aspects of human life. Education is the process of developing students' abilities. The importance of developing learning media is that using them can help students understand complex, abstract material more simply. This study aims to analyze the need for learning media in biology material at MA Darussalam Lempuing OKI. This study employed quantitative descriptive analysis techniques. Data collection used a questionnaire, with subjects being 11th-grade students and biology teachers at MA Darussalam Lempuing, OKI. The sample for this study consisted of 30 students. The analysis showed that only 23% of activities supported student collaboration, and that 60% of students' conceptual understanding remained low. This was influenced by the use of less engaging learning media, such as PPT (50%), YouTube (33%), and visual aids (17%). Furthermore, the teaching method used by teachers remained dominated by lectures (57%), leading to student boredom and disinterest. Thus, a flashcard learning media integrated with augmented reality is needed to improve students' collaboration skills and their mastery of concepts through the TGT model.

Keywords: Collaboration; Concept Mastery; Learning Media.

Introduction

Education has become a crucial aspect of human life. It is a process of developing students' abilities. In this era, teachers are required to manage information, select learning methods, utilize infrastructure, and select appropriate media for the learning process, all of which contribute to the development of outstanding students [1].

Learning media is a tool that can facilitate teachers in delivering material. Teachers' use of learning media to convey messages to students can motivate students and increase student activity. The use of learning media can enable students to interact directly and improve their abilities. The use of learning media has advantages, including that it can clarify the delivery of information beyond verbal communication, overcome the limitations of space, time, and human sensory capabilities, increase interest in learning, foster positive and enjoyable interactions between students and the learning environment, allow students to learn independently by adapting to their interests, and foster a shared understanding among students [2].

Learning media are divided into several types based on their function and needs. Audio media are media presented in the form of sound or sound recordings that rely on the sense of hearing. Visual media is learning media presented using images. Audiovisual media is a learning medium presented through sound and images, such as video. Multimedia is a learning media that provide a high level of interaction, such as text, sound, still images, moving images, and technology-based media [3].

Learning media facilitate the learning process, enabling effective and measurable evaluation. Learning media provide experiences and skills relevant to everyday life, not only literacy and numeracy, but also technological understanding needed in today's digital age. Media literacy skills and understanding can provide a sustainable and consistent learning experience, both inside and outside the classroom [4].

The importance of developing learning media lies in their ability to assist students and simplify their understanding of complex and abstract material [5]. To identify the learning media needs of teachers and students, a needs analysis can be conducted [6]. A needs analysis is a process that begins with directly observing the needs of students and teachers. This involves steps such as determining data-collection instruments, data collection, data processing, data analysis, and data interpretation [7].

Previous research by Hasan on the analysis of the needs for educational flashcard learning media based on local culture at SD 13 Woja [8]. Research by Anggraini conducted at SDN Jayamukti, Tasikmalaya Regency, analyzed the need for flashcards as a medium for emotional literacy training [9]. Abdurazak conducted research on the analysis of flashcard media needs in science learning on food chain material to improve learning achievement in SDN Purbayasa and SDN Dermasandi [10]. Meanwhile, research by Ningrum on the analysis of the needs for developing flashcard learning media at De Green Camp Islamic Middle School [11]. Previous relevant research on learning media analysis has been conducted primarily at the elementary and junior high school levels. This analysis also examined the need for media use to improve learning achievement, emotional literacy training, and local culture. The novelty of this research lies in the subject area of Madrasah Aliyah (MA) students and the aim of improving conceptual mastery and collaboration skills.

Based on this review, it is important to conduct a needs analysis of learning media. The author intends to

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analyze digital learning media to improve mastery of concepts and collaboration skills at MA Darussalam Lempuing, OKI. This study aims to analyze the learning media needs for biology at MA Darussalam Lempuing, OKI. Based on this, the development of learning media is necessary to help improve the quality of learning.

Research Methods

The method used in this research is a descriptive method for analyzing the media used in the learning process. The research used the define stage, the first part of the 4D development [12]. In the define stage, there are five activities for analyzing the media development needed. Front-end analysis is the initial activity for evaluating the media or methods used in learning to identify deficiencies in the learning media. Learner analysis is an activity to obtain information for needs that will be developed. Task analysis is the analysis of student characteristics. Concept analysis selects and conceptualizes the material to be used based on the analysis results. Specifying instructional objectives is the final part of this stage, namely formulating learning objectives. After that, the researcher will develop learning media to improve the learning process.

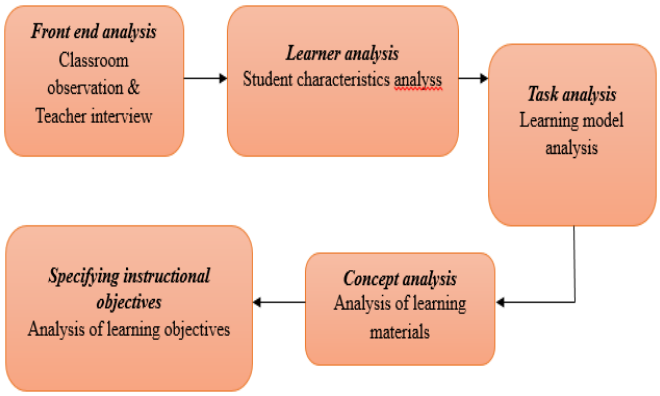

Figure 1. Define the 4D model's stages.

Table 1. Questionnaire sheet grid for teacher

Aspect	Indicator
Learning Media	Learning media used Created learning media from publishers Preferred learning media Model-based learning media
Learning Model	The learning model used The syntax of the learning model used Integration with Al-Quran verses
Difficult material	Biology material is considered difficult in odd and even periods
21st-century skills	21st-century skills developed 21st-century skills that are hard to develop
Evaluation	Concept Understanding Cognitive learning outcomes
Need	The need for teaching media to facilitate 21st-century skills

Data collection through interviews and questionnaires served as a reference for drawing conclusions. The subjects used in this study were biology teachers and 30 11th-grade students of MA Darussalam Lempuing, OKI. Interviews were conducted with biology teachers who teach in 11th grade. Data collected through interviews and questionnaires were then analyzed and described. Before being distributed, the questionnaire was validated by the supervising lecturer. The questionnaire for teachers consisted of 15 questions across 6 components: learning media, learning models, difficult materials, 21st-century skills, evaluation, and needs. The student questionnaire consisted of 19 questions across 7 components: learning process, learning methods, learning models, learning media, materials, evaluation, and needs. The teacher and student grids are shown in Tables 1 and 2.

Table 2. Questionnaire sheet grid for students

Aspect	Indicator
Learning Process	The teacher in delivering the material Providing examples to explain the material
Learning Methods	The learning method used Students feel bored
Learning Model	Relating material to problems in everyday life
Instructional Media	Learning media used
Material	Difficult to understand material Integrated with verses of the Quran
Evaluation	Practice Questions Student Assignment Grades Student KKTP Conceptual Understanding
Need	The need for teaching media to facilitate 21st-century skills

Results and Discussion

Fron-end Analysis

The results of the questionnaire analysis show that the learning process at MA Darussalam Lempuing OKI has not optimally supported the development of collaborative skills and mastery of student concepts, as shown in Figure 2. Learning that supports collaborative activities is only 23% of student assessments. This is also reinforced by the teacher's statement that there are few group activities in the learning process. The results of the concept mastery analysis indicate that 60% of students have not mastered the material covered by the teacher, as shown in Figure 3. The teacher said that many students still have not mastered the material taught, especially the biology material, which students find difficult. According to Suaidiah et al., collaboration skills during class learning can influence student learning outcomes [13]. Meanwhile, according to Rahayu, students need mastery of concepts to understand the material, conditions, and circumstances based on facts, and to be able to explain them using their own language [14].

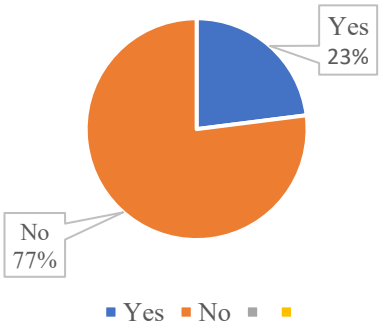

Figure 2. Analysis of activities that support collaboration skills.

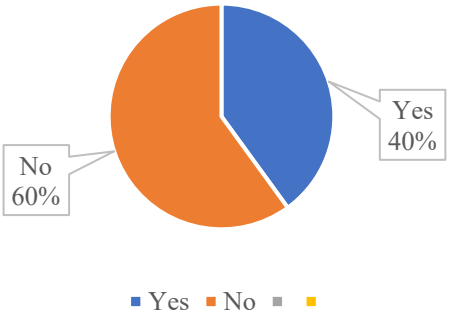

Figure 3. Analysis of students' conceptual understanding.

The learning media used during the learning process at MA Darussalam Lempuing OKI still mostly use media with minimal interaction, such as using PowerPoint (PPT) and YouTube videos, as shown in Figure 4. Meanwhile, the use of 100% AR Flashcard media has never been used in the learning process, as shown in Figure 5. This results in students being inactive in interacting, which is one of the characteristics of collaboration. According to the analysis results, students need engaging media, such as flashcards or augmented reality, that involve substantial student interaction, as shown in Figure 6. According to Kena, Flashcard Augmented Reality media can make learning more dynamic and engaging, thereby improving students' skills [15].

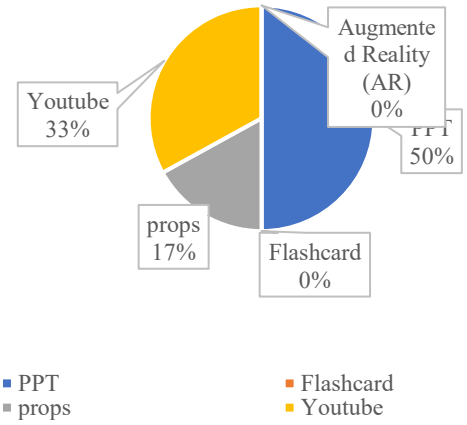

Figure 4. Analysis of learning media used by teachers

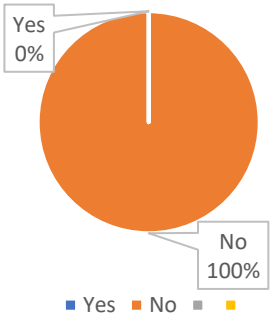

Figure 5. Analysis of the Use of Augmented Reality (AR) Flashcard Media

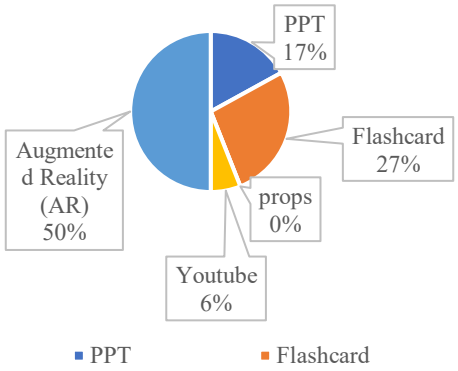

Figure 6. Analysis of student learning media needs

Teachers still mostly use conventional methods, namely lectures, as shown in Figure 7. Learning that focuses solely on the teacher leaves students bored, making learning uninteresting, as shown in Figure 8. This can actually reduce students' ability to collaborate and their understanding of concepts. This also affects student learning outcomes, as 60% of students have not met the KKTP, as shown in Figure 9. According to Tamboo, Flashcard AR can make learning more dynamic and relevant by displaying material that looks real, keeping students interested and not bored during the learning process. According to Tamboo, Flashcard AR can make learning more dynamic and relevant by displaying material that looks real, so that it can make students interested and not bored during the learning process [16].

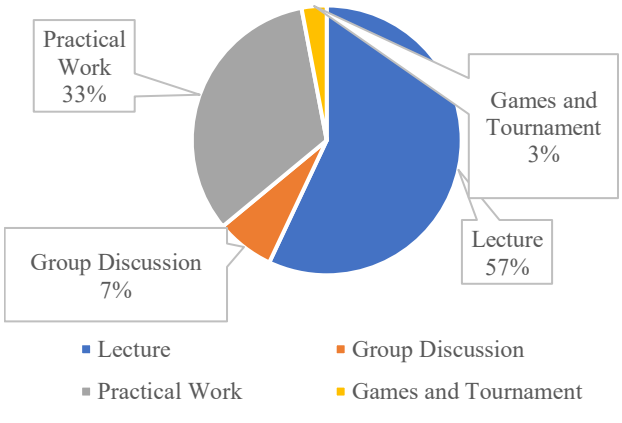

Figure 7. Learning method analysis

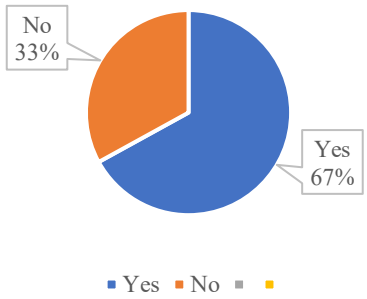

Figure 8. Analysis of the student learning process

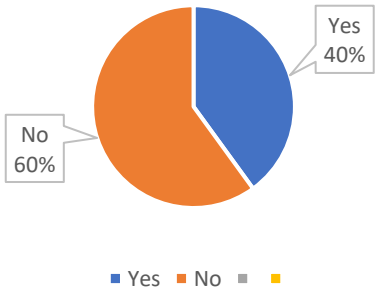

Figure 9. Analysis of student learning outcomes

As many as 60% of students have not mastered the digestive system material, and students feel it is difficult to understand, as shown in Figure 10. In addition, according to students, teachers have never used games in the learning process, as shown in Figure 11. According to Maharani and Ardian, learning with the TGT model can help students improve their learning through the games played, making them more enthusiastic and free to collaborate to solve problems [17].

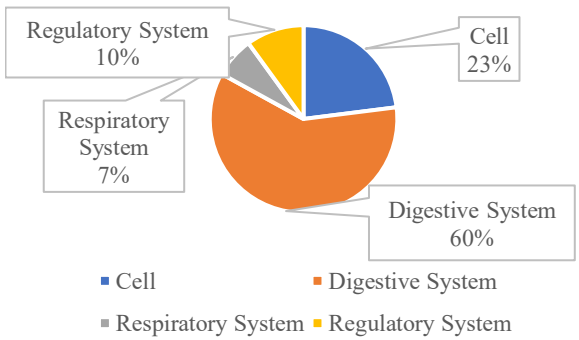

Figure 10. Analysis of material that students find difficult

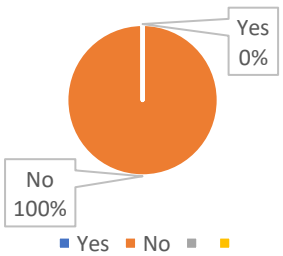

Figure 11. Analysis of the use of games in learning

Learner Analysis

Based on student characteristics, the analysis shows that students continue to struggle with comprehensive, abstract biology material. This is due to teachers delivering material in class using the lecture method, leaving many students bored during the learning process. Based on a student questionnaire, the material considered most difficult was the digestive system, as the explanation was still difficult for students to understand.

Task Analysis

Students are tasked with analyzing and discussing the process of food digestion from the mouth to the anus. They will identify how mechanical and chemical digestion occur through the organs of the human body, the enzymes that aid in digestion, and disorders of the digestive system.

Concept Analysis

Material that is difficult for students, as identified in the questionnaire analysis, is organized into a concept map. Concept maps are used to make it easier to determine the sub-material that will be used in the learning process, as shown in Figure 8 below.

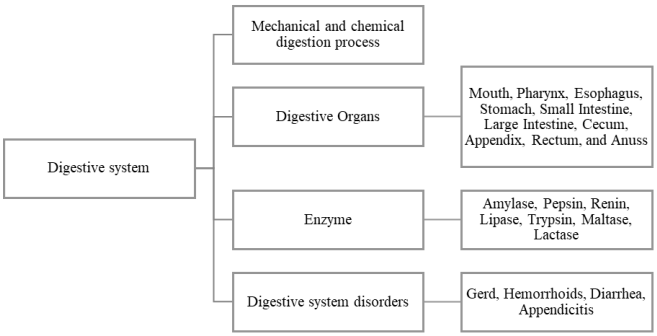

Figure 8. Digestive system concept map

Specifying Instructional Objectives

Based on Phase F Learning Outcomes, the learning objectives that must be achieved by students are to analyze the relationship between organ systems (digestive system) and respond to internal and external stimuli.

A questionnaire analysis at MA Darussalam Lempuing, OKI, showed that only 23% of students believed that classroom learning activities supported student interaction. This indicates that the teachers' learning process is not optimal. The absence of group activities during learning can lead to a lack of contributions, cooperation, and mutual respect among students. Students' low collaboration skills are also a result of the lack of group activities. Designing effective group activities can train students to be creative, communicate effectively, and work together [18].

Based on the questionnaire analysis, students' conceptual mastery is generally low. As many as 60% of students still struggle to master the concepts taught by their teachers, especially in biology, which they consider difficult. Biology contains concepts that are difficult for students to grasp and contains a lot of unfamiliar vocabulary, making it difficult for students to master the material [19]. Concept

mastery in conventional learning must be modified and innovated to meet current learning challenges [20].

Collaboration skills and conceptual understanding are related to many aspects, including the learning media and methods used. A questionnaire analysis of learning media at MA Darussalam Bumi Agung revealed that the most frequently used media were PowerPoint (PPT) at 50% and YouTube videos at 33%. The questionnaire analysis also revealed that students preferred Augmented Reality (AR) media (50%) and flashcards (27%).

Learning media is a crucial factor in the learning process. Teachers use learning media as intermediaries and aids to facilitate student understanding during the delivery of material. The use of learning media can help students develop interests and new experiences, as well as foster motivation and enthusiasm for learning. Therefore, media selection and use must be appropriate to facilitate the achievement of desired learning objectives. Utilizing these media can enhance students' effectiveness, efficiency, and engagement during the learning process [12]. [21].

Flashcards are learning media packaged as cards containing images or photos and brief explanations [22]. Meanwhile, Augmented Reality (AR) is a media technology that makes 3D objects appear realistic. AR-based flashcards are picture cards with brief information, combined with technology such as mobile phones to create realistic objects [23]. The use of AR flashcards makes learning engaging and interactive, helping students understand abstract concepts in learning materials [24].

Analysis of the learning process for students of MA Darussalam Lempuing OKI shows that conventional learning through lectures is still widely used, namely 57%. This also affects the results of the student questionnaire: 67% of students feel bored, leading them to be uninterested in the learning process. Enjoyable learning makes students interested and also improves the quality of their learning outcomes [25]. Teachers can choose an enjoyable learning approach, such as developing an interesting and innovative learning model, such as the Teams Game Tournament (TGT). The TGT learning model is one of the cooperative learning models that can help students improve collaboration skills, such as group discussions, conveying ideas, completing assignments together, and respecting fellow group members [26].

Conclusion

Based on the study's results, students' collaboration skills and conceptual understanding at MA Darussalam Lempuing OKI remain low, likely due to the use of less engaging learning media. The learning media used are dominated by PowerPoint (PPT) and YouTube videos that involve little student interaction. The media used so far have not attracted students, so they are less helpful in improving collaboration skills and mastery of concepts. The teaching method still relies heavily on lectures, leaving students bored and uninterested in the learning process. Therefore, teachers at MA Darussalam Lempuing OKI need Flashcard learning media integrated with Augmented Reality to improve collaboration skills and mastery of students' concepts through the TGT model. This research is expected to support further research on the development of AR Flashcard learning media and on improving education quality in Indonesia.

Author's Contribution

C. Dwinata: as the first researcher, he was responsible for the digital learning media needs analysis article. W. Saputri & M. Astriani: as supervisors, assisted in the creation of this article.

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