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Needs analysis of an augmented reality-based picture story module to improve social awareness and reading literacy among elementary school students

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ABSTRACT

This study aimed to reveal students' needs for Augmented Reality-based picture story modules to improve reading literacy and social awareness. The subjects of this study were 30 fifth-grade students from SD S Muhammadiyah Sungailiat. Data collection techniques included interviews, observations, questionnaires, and documentation. Qualitative research data were analyzed through three stages: data reduction, data presentation, and conclusion drawing. Quantitative data from the needs questionnaire were analyzed using a percentage formula to determine the level of students' needs for AR-based picture story modules. Furthermore, to maintain data validity, this study used source and technical triangulation techniques. The results of this study indicate that the need for AR-based picture story modules is high. The percentage range of needs for Augmented Reality-based picture story modules is at 73.33% - 87.50%. These findings are seen in each indicator, namely the reading interest indicator and picture stories, which obtained a percentage of 86.67%. This percentage indicates the category of "very needed." The indicator of difficulties and weaknesses in current learning obtained a percentage of 73.33%. This percentage is in the category of "needed." The indicator of the need for a new learning module obtained a percentage of 83.61%. This result is classified as the category of "very needed." The indicator of student acceptance and interest in AR obtained a percentage of 87.50%. This indicator category is "very needed." This is an indicator of the need for module features. The results of the analysis of this indicator showed a percentage of 85.67%. This indicator is in the category of "very needed." Based on these findings, it can be concluded that students need an AR-based picture story module that can make learning activities more interactive, interesting, and meaningful. AR-based modules can be designed to improve reading literacy and social awareness of students. This research serves as the basis for the development of an Augmented Reality-based picture story module in the next research stage.

Keywords: picture story module, augmented reality, reading literacy, social awareness, needs analysis

1. INTRODUCTION

In the 21st century, information and communication technologies have experienced rapid development. Technological developments have played a crucial role in education. One form of technology that can be utilized in learning activities is Augmented Reality (AR). AR has several superior features that can make learning activities more engaging and facilitate students' understanding of the learning materials. This is because AR can present virtual objects in the real world, allowing students to interact with them as if they were in a real environment. As Radu (2014) stated, AR is an appropriate and effective technology for learning activities. AR technology offers engaging features that can increase student motivation (Prabowo & Wakhudin, 2024).

Selecting engaging learning materials is crucial for elementary school education. This is evident in the development of elementary school students at the concrete operational stage of development. At this stage, students require real objects and direct experience to support their learning activities. Students understand learning materials more easily when they are linked to real objects (Irwandi & Fajeriadi, 2020). Therefore, with this consideration, learning activities will be more meaningful and make it easier to achieve learning goals.

Reading literacy is one of the learning objectives that elementary school students must achieve. Reading literacy is a skill that elementary school students should possess. Students can more easily comprehend reading through strong reading literacy skills. Based on this, basic reading literacy skills must be a top priority in learning activities (Kurniawan & Parnawi, 2023). However, current data show that students' reading literacy remains low. This contributes to poor reading comprehension skills among students. Low reading literacy skills make it difficult for students to learn (Dewi et al., 2024).

Based on the explanation of the importance of reading literacy, efforts are needed to improve it further. One effort can be made through the use of appropriate teaching materials, such as illustrated story modules. Illustrated story modules are a teaching material that can be used to improve reading literacy in elementary school students. Illustrated story modules present a more engaging combination of text and illustrations, making it easier for students to understand the plot and meaning of a story. However, conventional illustrated story modules are limited to one-way learning, making learning boring. Therefore, an interesting interactive feature is required.

One interactive feature that can be combined with illustrated story modules is Augmented Reality (AR) technology. The use of AR in illustrated story modules makes the storylines more vivid and realistic. AR can also present sound effects, images and simple interactions (Alhamad et al., 2024). AR technology makes stories more engaging and actively engages students in the learning process. By utilizing AR in learning activities, it is hoped that students will improve their reading literacy skills.

Previous research conducted by Danaei et al. (2020) showed that the use of AR-based storybooks can improve students' comprehension of the stories they read. Furthermore, the use of AR technology can increase students' interest in reading (Ebadi & Ashrafabadi, 2022). In addition to improving reading literacy, illustrated story modules can be designed to increase social awareness. Social awareness plays a crucial role in increasing student participation in community activities and fostering better leadership (Fitri et al., 2024). Based on this statement, social awareness must be developed in elementary school students. This is because, at the elementary school level, students begin to learn to build social relationships with the community environment.

Selecting AR-based picture story modules is the right choice for increasing social awareness. Picture story modules can be designed to promote social awareness. Through the stories within the modules, students can learn the moral messages. Furthermore, the combination of AR within the modules makes the storyline seem more realistic, allowing students to grasp the meaning of the story more easily. This aligns with the research conducted by Kirani and Cahyaningtyas (2025), who showed that combining AR with picture storybooks is an effective learning innovation.

Based on this explanation, it can be concluded that AR-based picture story modules have important benefits in supporting learning activities, including improving reading literacy and social awareness in elementary school students. However, developing AR-based picture story modules is not

easy, as they must be tailored to the needs of the field. Therefore, a needs analysis must be conducted before developing an AR-based picture story module. The purpose of a needs analysis is to ensure that the product being developed can be optimally utilized by those who need it (Nasrulloh & Ismail, 2017).

Based on the above explanation, this study aims to conduct a needs analysis study of an Augmented Reality-based picture story module to improve reading literacy and social awareness in elementary school students. The results are expected to provide constructive suggestions for the development of a more effective AR-based picture story module, which can also improve reading literacy and social awareness in elementary school students.

2. METHOD

This research is a needs analysis study. The approach employed is descriptive qualitative, supported by quantitative data. The purpose of this study was to determine the needs of students and teachers for the module to be developed: an Augmented Reality-based picture story module that can be used to support learning activities and improve reading literacy and social awareness in elementary school students.

This research was conducted at SD S Muhammadiyah Sungailiat. The subjects were 30 fifth-grade students, serving as the primary data source to uncover the need for an AR-based picture story module tailored to their characteristics. In addition to students, teachers also served as informants for this research because they play a crucial role in the learning process, understanding student behavior, and identifying obstacles encountered in classroom learning activities.

To obtain research data, this study used data collection techniques such as interviews, observations, questionnaires, and documentation. Interviews were conducted with teachers to determine their needs for picture story modules tailored to the curriculum. Observations were conducted to observe field conditions. A needs questionnaire was used to determine students' level of need for AR-based picture story modules. Documentation was conducted to support and strengthen the findings.

After the research data was collected, the data was analyzed. Qualitative data were analyzed through three stages: data reduction, data presentation, and conclusion drawing. Quantitative data from the needs questionnaire were analyzed using a percentage formula to determine students' level of need for AR-based picture story modules. Questionnaire data were also analyzed to determine students' difficulties in learning activities and required features in the modules. Furthermore, to maintain data validity, this study employed source triangulation and technical triangulation techniques. This research method is expected to provide a comprehensive picture of the need for AR-based picture story modules.

3. RESULT AND DISCUSSION

3.1 Result

This research was conducted at SD S Muhammadiyah Sungailiat. The subjects were 30 fifth-grade students. The purpose of this study was to determine the level of need for an AR-based picture story module that can be used to improve reading literacy and social awareness among elementary school students. This study identified five indicators of need for an AR-based picture story module: interest in reading and picture stories, learning difficulties and weaknesses, need for new learning modules, acceptance and interest in AR, and need for module features.

The analysis of the first indicator, related to interest in reading and picture stories, yielded a percentage of 86.67%. This percentage indicates a "very much needed" category. These findings illustrate that students are more interested in reading stories accompanied by pictures. Stories accompanied by pictures make it easier for students to understand the storyline and make learning more engaging.

Furthermore, the indicator for current learning difficulties and weaknesses yielded a percentage of 73.33%. This percentage falls into the "needed" category. This indicator indicates that many students still experience difficulties and challenges in understanding reading content presented in simple and conventional ways. The modules used in current learning activities still do not support student comprehension. This represents a barrier that requires appropriate solutions.

The analysis of the indicator for the need for new learning modules yielded a percentage of 83.61%. This result falls into the "very needed" category. This means students need innovative learning modules that are more engaging and facilitate comprehension. Attractive module designs should be integrated with technological developments. This allows for the combination of various media elements within the module.

Furthermore, the indicator for student acceptance and interest in AR yielded a percentage of 87.50%. This indicator is categorized as "very much needed." The analysis results indicate that students are attracted to the development of Augmented Reality-based modules. Students are more interested and passionate about learning through technology integration. Learning with AR can be designed to enhance student engagement in learning activities. In relation to illustrated stories, AR can present objects as if they were more real and lifelike. Integrating AR into learning modules is also expected to increase learning motivation in elementary school students. This is because motivation plays a crucial role in achieving learning objectives.

The next analysis focused on the module feature needs indicator. This indicator yielded a percentage of 85.67%. This indicator falls into the "very needed" category. Some features required in AR-based illustrated story modules include a combination of video, images, animation, text, and practice questions. Furthermore, the developed modules must be interactive and engage students in deeper learning. The module design must also integrate moral messages related to social awareness into the storyline. The results of the analysis for each indicator are presented in Table 1 below.

Table 1. Results of Needs Analysis Based on Indicators

Needs Indicator	Average Score	Percentage (%)	Category
Interest in reading and picture story materials	3.47	86.67%	Strongly Needed
Learning difficulties and current instructional challenges	2.93	73.33%	Needed
Need for a new learning module	3.34	83.61%	Strongly Needed
Student acceptance and interest in Augmented Reality (AR)	3.50	87.50%	Strongly Needed
Feature Requirements in the Learning Module	3.43	85.67%	Strongly Needed

Furthermore, interviews with teachers regarding the need for AR-based picture story modules revealed that they fully support the development of AR-based picture story modules. The development of AR modules is expected to increase student engagement in learning activities. Furthermore, the modules will also improve reading literacy and social awareness among elementary school students.

3.2 Discussion

Based on the analysis of the research results, overall, it indicates that teachers and students at SD S Muhammadiyah Sungailiat require Augmented Reality-based picture story modules. This is based on the fact that almost all need indicators are in the high category. The percentage of need for Augmented Reality-based picture story modules ranges from 73.33% to 87.50%. The design of the Augmented Reality-based picture story module is expected to improve reading literacy and social awareness. Furthermore, the module to be developed can also increase student activity in learning activities. Through active learning activities, learning outcomes are maximized (Handayani, 2014).

The design of the Augmented Reality-based picture story module should consider students' cognitive developmental stages. Elementary school-aged students are in the concrete operational stage of development. At this stage, students' ability to think logically and concretely (Putriana et al., 2021). Therefore, an Augmented Reality-based picture story module is an appropriate choice for implementation in student learning activities. However, the module development design must be tailored to student

characteristics to create more effective, enjoyable, and interactive learning (Wahidin, 2025). The selection of media elements, such as color combinations, images, text, audio, and video, must be designed to be more engaging.

The needs analysis results in this study indicate that students are more motivated when learning using modules that integrate engaging text and images. The integration of images into stories can help students develop their imagination, making it easier for them to understand the storyline. The use of images in stories has the benefit of increasing student motivation and facilitating the understanding of the story's message (Pahrun et al., 2022).

Furthermore, this study reveals that students need AR-based illustrated story modules that not only convey theoretical knowledge but also make learning activities more meaningful and enjoyable. Therefore, the development of Augmented Reality-based illustrated story modules should be designed to provide opportunities for students to actively participate in learning activities. Learning that involves student activity makes learning more meaningful (Nurjanah et al., 2023).

Other findings in this study also indicate that students are more interested in using Augmented Reality technology in their classroom learning activities. The integration of Augmented Reality technology into illustrated story modules can be a solution as a tool to increase student interest in learning and overcome learning difficulties. Therefore, the development of AR-based illustrated story modules must pay attention to the needs for the features required in the module.

Referring to the findings above, fifth-grade students at SD S Muhammadiyah Sungailiat generally require an Augmented Reality-based picture story module. This module is expected to be designed to improve reading literacy and social awareness. Based on the findings of this study, the development of an AR-based picture story module is highly recommended to improve the quality of learning activities, making them more meaningful and enjoyable

4. CONCLUSSION

Based on the results of the data analysis of the need for an Augmented Reality-based picture story module, it can be concluded that fifth-grade students of SD S Muhammadiyah Sungailiat need an Augmented Reality-based picture story module. These findings can be seen in each indicator, namely the reading interest indicator and picture stories, obtained a percentage of 86.67%. This percentage indicates the category of "very needed." The indicator of current learning difficulties and weaknesses obtained a percentage of 73.33%. This percentage has a category of "needed." The indicator of the need for a new learning module obtained a percentage of 83.61%. This result is classified as the category of "very needed." The indicator of student acceptance and interest in AR obtained a percentage of 87.50%. This indicator category is "very needed." The indicator of module feature needs. The results of this indicator analysis obtained a percentage of 85.67%. This indicator is in the category of "very needed."

The development of Augmented Reality-based illustrated story modules is expected to not only convey knowledge but also enhance the quality of learning activities. Therefore, the design of the AR-based illustrated story modules to be developed must take into account the students' cognitive development stages. Elementary school-aged students are entering the concrete operational development stage. Their thinking ability is about something logical and tangible. Therefore, the development of such modules should be able to visualize objects as if they appear real and alive and present the moral message from the storyline. This is what will make learning activities meaningful. Also, attention must be paid to the selection of media features/elements, such as text, images, animation, audio, and video, in creating module designs. This is done to make learning activities more engaging.

Ethical approval

This research did not require ethical approval.

Informed consent statement

This research has obtained participant consent (informed consent).

Disclosure Statement
No potential conflict of interest was reported by the author(s).

Data availability statement
The data presented in this study are available on request from the corresponding author due to privacy reasons

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Notes on Contributions

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