Needs analysis of picture story book using augmented reality technology

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Abstract. As early as 2014, a survey of smartphone and tablet use by children has been done by the Asian parent Insight with Samsung Kidstime in Southeast Asia. A total of 2,714 parents and 3,917 children aged 3-8 years have been the respondents of this survey. 85% of parents expect their children to use smartphones for educational apps, but 72% of younger children prefer to play games. This study aims to analyze the needs of students and teachers for picture books with characters based on Demak local wisdom using AR technology for understanding the healthy lifestyle of elementary school students. This research is preliminary research from research and development. The design of this research is need analysis or survey research. Data collection through questionnaires. Data were analyzed quantitatively. The results showed that the development of a picture book containing characters based on the local wisdom of Demak using augmented reality technology is needed for understanding students' healthy lifestyle.

1. Introduction

With the development of smartphones with the Android platform, many people use them, even children already know how to use smartphones. In line with the development of information technology, innovation is needed in the world of education because with this innovation the quality of education can be improved. In early 2014, a survey on the use of smartphones and tablets by children was conducted by the Asian Parent Insight with Samsung Kidstime in Southeast Asia. The result is that 98% of children in Southeast Asia use Mobile Devices (the Asianparent Insights, 2014). This survey also shows that 83% of parents want their children to use smartphones for book applications, but 72% of children tend to use smartphones for game applications.

A pictorial story as a graphic medium used in the learning process has a practical meaning, that is, it can communicate facts and ideas clearly and powerfully through a combination of the expression of words and pictures[1]. Augmented reality (AR) is a technology capable of combining two-dimensional (2D) and or three-dimensional (3D) virtual objects into a real environment, then projecting these objects in real-time[2]. The use of augmented reality in picture storybooks is intended to enrich the user's experience, help users' perception and interaction with the real world. The information displayed by virtual objects from picture storybooks is expected to help users carry out real-world activities in terms of
education, communication, interaction, and learning. This can also be applied in understanding healthy lifestyles for students.

Remembering health is one of the most valuable assets for every individual. As the saying goes, "mensana in corpore sano" which means that in a healthy body there is a strong soul. A healthy body is a very important factor because if the body is unhealthy all activities will not be disturbed, whereas if you have a healthy body all activities can be carried out smoothly and you can enjoy a happy life. One way to stay in shape is to adopt a healthy lifestyle[3][4]. How important it is to understand a healthy lifestyle so that everyone can apply it in their daily life. For this reason, a healthy lifestyle needs to be introduced to students from an early age.

Given the number of children in Indonesia on average, 30% of the total population of Indonesia and school age is a golden period to instill the values of clean and healthy living habits (PHBS). However, based on the results of observations to fourth-grade students of SDN Rejosari 3 on February 29, 2020, it turns out that there are still many students who have unhealthy lifestyles. Besides, the results of an interview by one of the SDN Rejosari 3 teachers on April 11, 2020, stated that the media was not appropriate and interesting for students about understanding a healthy lifestyle.

Actually, there are many ways you can do to understand healthy living in children. Can be done with a healthy life introduction workshop; through school programs such as UKS, clean Saturday, morning exercise, and ant surgery through little doctor training; through a small school sanitation program; through healthy school competitions; through intervention programs; and can also be included in the school curriculum about the culture of healthy living for students[5][3][6]. Furthermore, an effective way to convey understanding to children is through stories. Stories always appeal to children because their imaginary brains are alive and indirectly the messages packaged through the stories will arrive. Neuroscientists say 90% of sensory input to the brain comes from visual sources and that the brain has a quick and natural response to simple and powerful symbols, icons, and images.

It is believed that picture books can be the right media to convey messages to children. A picture story book is a book that features images and text and the two are interrelated. In recent years, the use of picture book media has been proven to increase understanding of new things in students' lives and their environment[7]. Picture story books are also one of the right media to include character education. Recently, picture books have also been widely used as a medium for character development for students[8].

In addition, by including elements of local wisdom in it, it will certainly increase students' love for the local culture they have. Advice on local excellence needs to be explored deeper and processed for the learning process, in addition to understanding the material, the inclusion of local benefits in the learning process is also able to help raise the next generation against the love of the country[9].

By using augmented reality technology in picture story books, of course, will provide more benefits to students. The advantages of using information technology-based learning media include being part of a distance education program, and to encourage students to take advantage of their habits with technology to make it more useful in the teaching and learning process. Through technology and information, the resulting learning media can animate, communicate, and transfer information more dynamically. Also, it can include real-world contexts for students[10]. The use of the AR book has also been shown to increase the user's learning independence[11].

Based on the background above, the problem formulation in this research is, "What is the need for developing a picture book of character education based on local wisdom of Demak to understand the healthy lifestyle of elementary school students with augmented reality technology?". Meanwhile, the purpose of this study was to analyze the need for the development of a picture book of character education based on the local wisdom of Demak to understand the healthy lifestyle of elementary school students with augmented reality technology.
2. Methods
This research is preliminary research from research and development with the purpose to analyze the needs of students and teachers for picture story books containing characters based on the local wisdom of Demak using augmented reality technology for understanding the healthy lifestyle of elementary school students.

The design of this research is Need analysis or survey research. The subjects of this study were fourth-grade students and teachers at SDN Rejosari 1, SDN Rejosari 2, and SDN Rejosari 3. Data collection techniques through questionnaires and documentation. The instruments used were questionnaire sheets and school library documents. Data were analyzed using a quantitative percentage technique. The questionnaire used the Guttman scale with two yes or no answer choices so that clear, firm, and consistent answers were obtained. Consists of positive statements with a score of 1 for yes answers, 0 for no answers, and negative statements with the opposite score. Data were analyzed by calculating the total number of scores to obtain the percentage. Document analysis in the form of data on the number of school library books by calculating the percentage of each type and title of the book. The results of the questionnaire data analysis and documentation are then described to conclude.

3. Result and discussion
The results of this study are in the form of an analysis of the need for picture story books with character education based on Demak local wisdom using augmented reality technology obtained from student and teacher questionnaires, and documents on the number of book titles in the school library.

3.1 Research results

3.1.1. Teacher questionnaire results. Based on the results of needs analysis through questionnaires distributed to teachers, it is known that teachers need the development of picture books containing character education based on Demak local wisdom using augmented reality technology which can be an alternative as a medium for understanding students healthy lifestyle. The results of the teacher questionnaire can be seen in Table 1 below.

| Subject   | Total score | Percentage of needs |
|-----------|-------------|---------------------|
| Teacher A | 10          | 77%                 |
| Teacher B | 12          | 92%                 |
| Teacher C | 11          | 85%                 |
| Total     | 33          | 85%                 |

Based on table 1 above, it is known that 77% of Teacher A, 92% of Teacher B, and 85% of Teacher C need picture story books with character education based on Demak local wisdom with augmented reality technology. From these results, it can be concluded that overall a score of 33 was obtained with a percentage of 85% of teachers needing picture story books with character education based on Demak local wisdom with augmented reality technology.

3.1.2. Student questionnaire results. In addition to the results of the teacher's questionnaire, the results of the needs analysis were also obtained through questionnaires distributed to students. The results of the student questionnaire can be seen in table 2 below.
Table 2. The results of the needs analysis through a student questionnaire

| School            | Total score | Percentage of needs |
|-------------------|-------------|---------------------|
| SDN Rejosari 1    | 132         | 96%                 |
| SDN Rejosari 2    | 122         | 92%                 |
| SDN Rejosari 3    | 122         | 88%                 |
| Total             | 376         | 99%                 |

Based on table 2 above, it is known that 96% of SDN Rejosari 1 students, 92% of SDN Rejosari 2 students, and 88% of SDN Rejosari 3 students need picture story books with character education based on Demak local wisdom with augmented reality technology. From these results it can be concluded that overall a score of 376 was obtained with a percentage of 92% of students needing picture story books with character education based on Demak local wisdom with augmented reality technology.

3.1.3 Documentation results. In addition to data from teacher and student questionnaires, to analyze the need for illustrated story books with character education based on Demak local wisdom with augmented reality technology, document analysis is carried out in the form of data on the number of school library books. The results of the analysis can be seen in table 3 below.

Table 3. The results of document analysis on the number of book titles in schools

| Type of Book   | Number of book titles | Percentage |
|----------------|-----------------------|------------|
| Fairy tales    | 10                    | 1.26%      |
| Short story    | 13                    | 1.64%      |
| Picture story  | 23                    | 2.90%      |
| Poetry         | 3                     | 0.38%      |
| Folklore       | 11                    | 1.39%      |
| Lesson text    | 598                   | 75.51%     |
| Reference      | 134                   | 16.92%     |
| Total          | 792                   | 100%       |

Based on table 3 above, it is known that the total number of titles for the three sample schools was 792 with details of 10 titles of collection of fairy tales, 13 titles of short story books, 23 titles of picture story books, 3 titles of poetry books, 11 titles of folklore books, 598 titles of textbooks, and 134 titles of reference books. The results of the percentage of the number of book titles in the 3 schools were the highest for textbook titles as much as 75.51% and the least for the titles of poetry books was 0.38%. Meanwhile, for picture story books as much as 2.90%. Thus, based on the results of the document analysis on the number of book titles owned by the three schools, it can be concluded that schools need picture books with character education based on Demak local wisdom with augmented reality technology.

3.2 Discussion

Based on the results of the study, it is known that picture books containing character education based on local wisdom of Demak with augmented reality technology need to be developed to understand students' healthy lifestyle. The picture book that will be developed will contain children's world stories about healthy lifestyles. This is very important to convey to children from an early age so that they become good habits in their daily life.

The picture book that will be developed is tailored to the characteristics of elementary school students with backgrounds close to their daily lives. Broadly speaking, there are six kinds of children's literary genres, namely realism, formula fiction, fantasy, traditional literature, poetry, and non-fiction[12]. The genre contained in the picture book that will be developed in this study is the fiction genre. The story...
developed is in the form of a fictional story, but contains events that are happening today, namely the importance of a healthy lifestyle in everyday life.

_Pola Hidup Bersih dan Sehat_ (PHBS) is a reflection of a family lifestyle that always pays attention to and maintains the health of all members[6]. The emergence of various diseases that often attack school-age children (aged 6-10), was related to PHBS[6]. Therefore, planting PHBS values in schools is an absolute necessity. The PHBS indicators in schools include: 1) Washing hands with running water and using soap, 2) Consuming healthy snacks in the school canteen, 3) Using clean and healthy latrines, 3) Regular and measured exercise, 4) Eradicating larvae mosquitoes, 5) Do not smoke in school, 6) Weigh weight and measure height every month, and 7) Dispose of garbage in its place.

The picture book that will be developed takes the theme of children's healthy lifestyles which are divided into 5 sub-themes, including healthy food, adequate rest, regular exercise, prevention of coronavirus, and environmental hygiene. Thus, the picture book that will be developed is by the theory above.

In addition to containing an understanding of a healthy lifestyle for students, the picture books to be developed also contain character education in it. Character values need to be embedded in student learning activities both through the learning process and the teaching materials used. This is in accordance with the results of research which states that it is important to include character values in classroom learning[13].

One of the elements in a picture book is a character[12]. The characters in the illustrated story books will be developed using fruit characters. Meanwhile, the main characters include pomegranate fruit, guava image, and star fruit. This figure is based on Demak's local wisdom, in which the three fruits are local commodities of Demak Regency.

The local wisdom values of an area can be integrated into relevant knowledge for learning[14]. This is also in accordance with the results of research which states that local wisdom-based learning can build literacy for elementary school students[15].

The picture book that will be developed supported by augmented reality technology will be able to provide a real visualization, making it easier for students to understand the contents of the story. This is in accordance with the results of previous research that through augmented reality technology students will get more real information to improve student learning outcomes with high interpretation[16][17]. Picture story books with augmented reality technology not only contain 2-dimensional images but can display 3-dimensional visualizations that will motivate students to learn new things. An example of a picture story book with augmented reality technology can be seen in Figure 1 below.

![Fig 1. Example of a picture story book with augmented reality technology](image)

Previous research has proven that the use of augmented reality technology in learning can provide new experiences for its users[18][19][20]. Starting from this, using augmented reality technology in picture story books is expected to provide the same benefits to students.
Thus, it can be concluded that with the development of picture books containing characters based on the local wisdom of Demak with augmented reality technology, it is hoped that it can fulfill students' needs in understanding healthy lifestyles. Also, it is hoped that students will become more technology literate.

4. Conclusion and Suggestion

4.1 Conclusion.
From the results of needs analysis through questionnaires and documentation, it was found that the development of a picture book containing characters based on the local wisdom of Demak using augmented reality technology is needed for understanding students' healthy lifestyle.

4.2 Suggestion.
Based on the results of the needs analysis, it is suggested to develop a picture book with characters based on Demak's local wisdom using augmented reality technology to understand the healthy lifestyle of students.

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