Analysis of Android-Based Educational Game Media Development Needs for Social Studies Learning in Elementary Schools

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Abstract

This study aims to find out information about the need for educational games, students' perceptions of educational games, and educational game design according to teachers and students at Elementary Schools in Magelang Regency. The design of this study used a survey with interviews and questionnaires given to 132 fifth grade students at random. The data collection technique is by conducting interviews with teachers and distributing questionnaires and then analyzing the results with quantitative and qualitative descriptive statistical analysis techniques. The results showed that 80,5% of student were interested in using educational games in social studies learning with a good category. The implication of this research is an initial analysis before developing an educational game prototype in learning.

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INTRODUCTION

The development of technology has progressed rapidly and this has had an influence on the world of education, namely the use of technology in learning as a learning medium. As it is known that the media is a tool used to convey information/messages (Rusmono & Alghazali, 2019). The use of learning media can help teachers during the learning process, so that the messages conveyed are easier to understand, more interesting, and more fun for students (Princess, 2021). Therefore, learning media must be packaged properly and provide attractiveness so that students are enthusiastic to take part in learning.

One of the uses of technology as a learning medium is an Android-based educational game media. It is known that the intensity of children playing games has increased every year, ranging from children's games to adult games. At this time, almost all children, especially elementary school students, already have Android. Digital games as entertainment media are an alternative for learning, especially for elementary school students. This is because the age of students in elementary school is the age where students are still happy to play. According to Havukainen, children and games are two meanings that can hardly be separated from each other (Havukainen et al., 2020). Therefore, in learning teachers can

take advantage of games in the form of digital games, by playing while learning students are expected to be able to learn according to the demands of their level of development and the learning process becomes fun (Dimitriadou et al., 2021).

Educational games are games that combine play and learning (Aslan & Balci, 2015). Through educational games specifically designed to teach students (users) to practice skills, develop and understand concepts (Anggraini et al., 2016). The form of educational game media that will be developed is in the form of an Android-based digital game. Iacovides explained that digital games do not only present fun activities, but also activities related to learning content to achieve certain goals (Iacovides et al., 2011). In addition, digital educational games provide opportunities for users to develop skills, knowledge, and attitudes through the principles and features used in game play (Elsherbiny & Raya, 2021).

Another advantage is that educational games are able to stimulate students' curiosity so they are motivated to learn (Sulistiyarini et al., 2021). In addition, through game-based learning, teachers can also improve the quality of learning and can prepare students for critical thinking and problem solving (Rakasiwi & Muhtadi, 2021). Jaechoon's research shows that some students think that they feel positive feelings such as happy and enthusiastic when playing games (Jo et al., 2018). March Prensky's research states that students will be more optimal in learning when given games and modules that are oriented to the learning environment (Learning, 2001).

Based on the description above, it is known the importance of educational games in learning, it is necessary to collect information from teachers and students, about the need for educational games and the design of educational game presentations. In addition, information about teacher and student perceptions of educational games also needs to be collected. Teachers and students can become informants related to this educational game, considering the information obtained will then be developed into a game prototype that will be used in the area. Therefore, a needs analysis is needed regarding the development of Android-based educational game media.

METHODS

This research is a survey research with the aim of exploring to find out the need for educational games for elementary school students in Magelang Regency. The schools that became the research sample were 3 elementary schools in Magelang Regency. Each school selected 2 class teachers. The following are the details of the number of student respondents in table 1 below:

Table 1. List of research sample schools

School name	Respondent
SD Negeri Muntilan	58
SD Negeri Banyubiru 2	44
SD Negeri 1 Srumbung	30
Total	132

Data collection techniques in this study using questionnaires and interviews. The data collected is data on teacher and student perceptions, data on educational game needs and educational game formats. Perception aspects include knowledge and acceptance, understanding and assessment of educational games. The need for educational games is seen from the supporting facilities and infrastructure, access and use of game media. The educational game format includes content coverage, display and ease of navigation.

Data collection instruments used in the form of questionnaires and interview sheets. The questionnaire compiled includes a closed questionnaire using a modified Likert scale with four ratings, Strongly Agree (SS), Agree (S), Disagree (TS) and Disagree (KS). The questionnaire for students contains 25 items, while the questionnaire for teachers contains 30 items.

The instrument is validated through expert judgment. The data analysis technique that will be used is descriptive quantitative statistical analysis technique by calculating the percentage of the number of answer scores based on the scoring of each answer from the respondents. The percentage obtained is then compared with table 2 to obtain the criteria.

Table 2. Percentage of category division

Category	Percentage
Well	76 – 100%
Enough	56 – 75%
Not good	40 – 55%
Not good	< 40

RESULTS & DISCUSSION

The results of the analysis of students' perceptions of educational games, showed that students' interest in using educational games in social studies learning was in the good category with a percentage of 80.5%. Students also think that games can increase knowledge, especially in the field of technology. Likewise, teachers have the same perception that the use of educational games for learning is needed. The following is data on teacher perceptions of educational games in the following table 3.

Table 3. Analysis of teacher respondents' perceptions of educational games

No	Aspect	Conclusion
1	Education technology	Advances in technology today are very rapid and very useful, especially in the world of education, namely as a learning medium. With the help of technology, the media produced is more varied and innovative, so that it can be an attraction to build student learning motivation.
2	Utilization of technology in social studies learning	Various uses of technology as learning media, especially social studies, namely powerpoint, learning videos, e-modules, and even e-learning. With these media the learning process becomes more fun and makes it easier for students to understand the material being taught.

3	Educational games	Teachers have made educational games for learning media. Software that is widely used for media games is Kahoot and Quiziz. For the type of game that is often used is a quiz.
4	Benefits of educational games	Educational games are very useful, especially to motivate student learning, facilitate understanding of the material, and improve student achievement.

The results of the analysis of teachers' perceptions of educational games, show that teachers have understood the development of technology at this time. Educational technology is the application of organized knowledge as a product and process in overcoming student learning problems (Supriadi & Hignasari, 2019). Technology in education is very useful as a learning medium because it can help teachers deliver material to students. Teachers and students' perceptions of educational games have an important role in knowing interest in educational games and the extent of knowledge about education they have. Based on the results of the study, it is known that students' perceptions of educational games are included in the good category. This is in accordance with research conducted by UCU regarding students' perceptions of the use of educational games in the learning process (Cahyana et al., 2017). The results of this study indicate that students' perceptions of the use of online educational games are high, because learning with educational games is very fun.

Based on the results of the interview, the teacher said that educational games were very useful to implement because they could motivate students to learn so that student achievement could increase. The use of educational games in learning activities is no longer in doubt, because educational games are very useful for students to develop skills and develop abilities in solving problems (Prasetya, 2014). However, there were several obstacles that were found, including: (1) not all schools could implement educational games, because they depended on adequate facilities and infrastructure at the school and (2) teachers had to provide free time to make these educational games. The preparation of educational games certainly takes a long time, so teachers can use games that have been developed (Erhel & Jamet, 2016).

Currently there are many developers who provide educational games, this can be an alternative if the teacher has difficulty in making. Most teachers quite understand that educational games that are currently developing are still dominant in the cognitive domain and teachers use educational games to improve learning outcomes in the cognitive domain. This explanation can be strengthened by Yoskiko through educational games that can show cognitive achievement that is more than conventional learning (Okada & Matsuda, 2019).

Data/information about perception needs to be collected to find out how far the knowledge about educational games is. In addition, perception is an important predictor in the use of further learning resources (Chang & Hwang, 2017). This is because a good perception by the teacher is a good starting point for teachers and media developers to develop game-based media. Good reception because students and teachers have heard the term educational game from various sources. Various information related to the need for educational games was collected through closed questionnaires, including: availability of supporting facilities and infrastructure, access to educational game media, use of educational game media, material coverage, appearance and ease of navigation.

The results of the analysis of student needs for educational games and game formats are available in Figure 1, where in the aspect of the availability of supporting facilities and infrastructure, 80% of students state that their school has an Android tablet

that can be used when learning with educational games. This is in accordance with the results of interviews that almost all schools already have android tablets assisted by the government. The existence of facilities and infrastructure that already support but have not been utilized shows that there is a need in the school regarding educational games. Need is the gap between the current state and the state it should be (Herliandry et al., 2020). Ideally, in accordance with the demands of the 2013 curriculum, learning in schools has integrated learning using technology and information-based media. Information technology integration is one aspect of implementing the 2013 curriculum (Wahyuni et al., 2021).
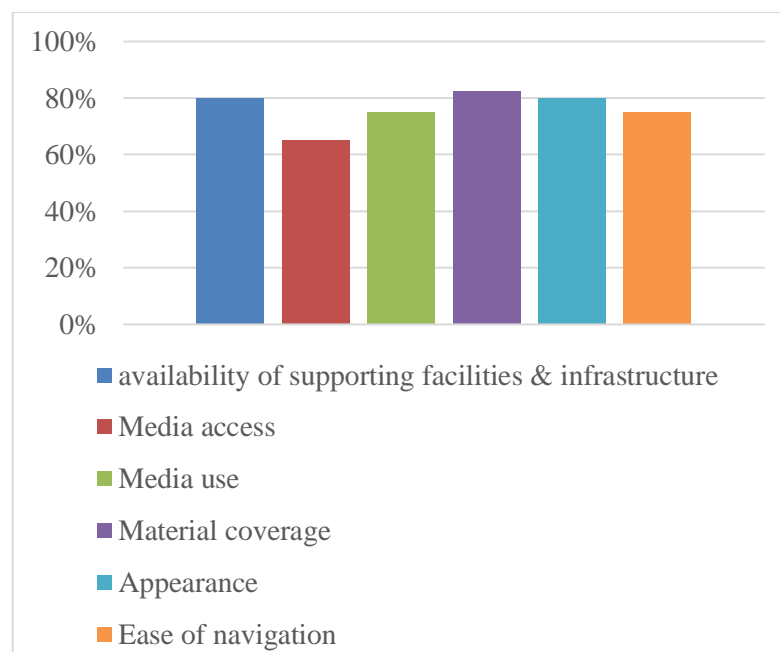

Figure 1. Analysis of student needs for educational games

In addition, in Figure 1, information is obtained that 65% of students have accessed games every day, where the most frequently accessed games are those on smartphones. This is in contrast to teachers who are not used to accessing games every day. Some students claimed to have accessed games containing subject matter and used them as a medium for independent learning (Hwang & Chang, 2020). This is in accordance with the usefulness of educational games that can be used by students in learning.

Based on the results of teacher interviews, although they do not often access games every day, they have accessed games that contain learning materials. In addition, most teachers stated that the scope of material in educational games should be adjusted to the competencies of this elementary school. Teachers also agree that games can stimulate critical thinking and problem solving skills, so that in the development of educational games it is necessary to consider these aspects. This is in accordance with Chen's statement that games are able to stimulate the formation of cognitive structures from different phenomena compared to traditional learning (Chen et al., 2019). Michael found that there is a significant relationship between cognitive and technology use(Young et al., 2012). According to William, this is because games allow players to learn in a challenging environment where they can make mistakes and learn by doing (Kavanagh & Miller, 2021).

Based on data collected from open questionnaires, according to students, games that should be developed are fun games such as games with the genre of adventure, crossword puzzle, and guessing pictures. Meanwhile, according to the teacher, games developed in learning are games with the type of quizzes, simulations or there are questions (evaluation). The teacher agrees that the animation used must be related to the indicators of the learning concept. The appearance of the game must be attractive with animation. In addition, the reward used in the game can be in the form of scores and the challenge is time. These elements must exist as stated by Hwang & Chang that the characteristics of digital games include goals, rules, interactive, feedback, and challenges (Hwang & Chang, 2020).

Based on the results of the study, it is known that the school already has facilities that support the learning of educational games (android tablets). Teachers and students have used games that contain learning materials. Teachers and students also have a good perception of educational games. The problem that arises is the availability of educational games in schools. Teachers do not yet have the skills to create android-based educational games. Therefore, the availability of educational games is a necessity for teachers and students. The educational games developed are expected to be accessible to schools.

The implication of this research is as an initial analysis before developing an educational game prototype in learning. The limitation is that this research is still limited in scope in Magelang Regency. Regions can have different characteristics or needs for educational games.

CONCLUSION

Based on the research that has been done, it can be concluded: 1) Teachers and students have a good perception of educational games. 2) The need for educational games according to the teacher is a game containing evaluation and simulation questions, while the adventure genre game is needed by students. 3) The most important elements in the preparation of educational games according to students are the forms of games that are challenging and attractive appearance. Meanwhile, according to the teacher, the educational game format must pay attention to the appearance, content, and affordability of the software. Information about game needs can be used to develop further educational games.

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