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Interactive Learning Media 2D Educational Game to Improve Learning Effectiveness in Kindergarten Students

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Abstract: The purpose of this study was to determine the feasibility of interactive learning media 2-Dimensional Educational Game to increase the effectiveness of learning in Kindergarten in Jepara Regency. The research method using Research and Development was adopted from Borg and Gall with three simplified stages, namely introduction, development, and effectiveness testing. Data collection techniques through observation, questionnaires and documentation. The effectiveness of teaching materials was obtained from the pretest and posttest scores in the control class and the experimental class. Based on the results of the study, it can be concluded that the interactive learning media of the 2-Dimensional Educational Game is declared feasible and can be used. This can be seen from the expert validation which states very well, as well as positive responses from teachers and parents of students. The interactive media of the 2-Dimensional Educational Game that has been developed is stated to be effective in improving listening and speaking skills, as well as children's learning interest. This is evidenced by the students' listening and speaking abilities in the experimental group which were better than the control class.

Keywords: Online learning media, 2D educational games, early childhood

1. Introduction

The Covid-19 pandemic has made changes in various sectors, including in the field of education where school learning is carried out online through learning from home programs (Riadil et al., 2020). This condition is also applied to Early Childhood Education. In the online learning system, there are several obstacles that are considered less effective, such as the provision of learning materials by teachers, technology literacy from teachers and parents who will guide children, as well as the economic condition of children (Satrianingrum & Prasetyo, 2020). Seeing this condition, as a teacher, he must immediately adapt and immediately find a way out of the problems that occur.

Online learning is the implementation of online learning classes to reach a massive and broad target group, so that online learning can be held anywhere and attended for free or paid (Bilfaqih & Qomarudin, 2015). In addition, online learning utilizes the internet network in the learning process and provides effective learning methods such as practicing with feedback, combining collaborative activities with independent learning, personalizing learning based on children's needs using simulations and games (Suhery et al., 2020). Online learning or the application of e-learning in early childhood education has become a practical solution to the problems faced (Ingsih et al., 2021). Online learning has benefits such as building communication and discussions between teachers and children, children interacting and discussing with one another, making it easier for children to interact with teachers and parents, the right means to see children's progress through parent reports with the aim that parents can see direct development, teachers can easily provide material to children in the form of images, videos, and audio that can be downloaded by parents directly, and make it easier for teachers to make materials anywhere and anytime (Hutami & Nugraheni, 2020; Harun et al., 2021).

During the online learning period, the role of teachers and parents greatly influences the development of students. However, there are still many teachers who are reluctant to change learning strategies and are lazy to find solutions. For this reason, children's enthusiasm for learning decreases, children's response to teachers also decreases. As a result, teachers cannot help optimize the growth and development of students according to their age stage.

Various activities are carried out by children at home with the help of their parents. The result of the activity in the form of a video is sent to the teacher. However, there are several obstacles, namely the activeness of parents in sending

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the results of children's activities. Of the many parents participating in the class group who are active in sending assignments every day, it is not the same, some are very active in sending, some are late but send, some send but not all and some even don't send assignments in a day because of busy parents.

The use of media serves as an intermediary tool for delivering learning material so that it can be accepted by students more easily in the learning process, and requires the use of appropriate media and can attract the attention of students (Nurrita, 2018). One of them is a smartphone.

The development of smartphones in the world is growing rapidly, Indonesia is no exception. Users are also diverse, ranging from children to parents. This makes a lot of changes in people's lifestyles. One of the changes is the use of smartphones, especially Android-based smartphones in their daily activities. Currently, there are many Android smartphones that already have good capabilities at affordable prices, such as running music applications, video, photo processing and running various games (Roslan et al., 2021).

Game is one of the entertainment that is favored by various groups ranging from children to adults. Chosen as entertainment because games are able to reduce one's fatigue from daily routines and fill spare time. Most games are made with different levels of difficulty, types of games that can be played as a means of entertainment. According to App Annie, one of the most popular types of games to play today is adventure type games. Therefore, choosing game media is one of the authors' considerations in carrying out learning activities for early childhood during the pandemic.

One of the applications that can be downloaded on Android smartphones is WhatsApp social media. WhatsApp social media is one of the media that can be used to send learning materials based on 2-dimensional educational games in carrying out online learning at kindergarten institutions in Jepara Regency. The WhatsApp application is in great demand by the public and is easy to apply. The WhatsApp application is the most popular application by various groups of people in Indonesia, including the guardians of students in the Jepara district. The WhatsApp application, especially the WhatsApp Group feature, is considered ideal to be used as a means of providing learning materials in the pandemic era, WhatsApp media is a type of social media that can facilitate sharing various media, ranging from documents (files), videos, audio, images, and voice notes or sound recording and so on. This is in line with the opinion (Setiadi, 2016), social networking sites are the most popular social media. These social media allow members to interact with each other. Interaction occurs not only in text messages, but also includes photos and videos that may catch the attention of other users. All posts (publications) are real time, allowing members to share information as to what is going on.

Various studies conducted on the use of media in learning came to the conclusion that the process and learning outcomes of students showed significant differences between learning without media and learning using media (Dita et al., 2021). Therefore, the use of learning media is highly recommended to enhance the quality of online learning or distance learning or in learning outside the network.

Media in the learning process can enhance the learning process of students in learning which in turn is expected to enhance the learning outcomes achieved (Hadi et al., 2017). Various studies conducted on the use of media in learning came to the conclusion that the process and learning outcomes of students showed significant differences between learning without media and learning using media. Therefore, the use of learning media is highly recommended to enhance the quality of online learning or distance learning and learning outside the network.

Previous research by (Koedoes et al., 2020) regarding early childhood education programs (PAUD) learning media solutions during the pandemic. One solution is to train PAUD teachers in the creation and development of multimedia-based interactive learning media including video, animation, image and audio aspects as well as the creation of interactive games applications specifically for early childhood education, the application of multimedia is intended to make it easier for PAUD students to understand subject matter because it contains image, video and audio information as well as with positive material content according to the needs of the PAUD curriculum (Pratama et al., 2021). The activities are carried out online in combination with direct assistance with health protocols, although the activities are carried out online, the activities can be carried out well.

With the background of the problem above, it is hoped that teachers will no longer be confused in providing learning activities that attract children's attention. One of the media that can be used to attract children's attention is to use 2-dimensional educational game media. For this reason, the author chose the title "Development of Android-Based 2D Interactive Learning Media to Improve Learning Effectiveness in Kindergartens in Jepara Regency.

1.1. Conceptual Framework

Made et al. (2020) said that the main purpose of early childhood education is to facilitate the growth and development of children as early as possible which includes physical, psychological and social aspects as a whole. Due to the Covid-19 pandemic, all children's playing activities while learning are assisted by their parents, and all children's activities are carried out at home with their parents.

During online learning there are several problems in learning in kindergarten, including the teacher does not use Information Technology media as a means of delivering learning material, the teacher is less creative in using media in learning, especially online, students are less enthusiastic and passive in participating in learning especially in listening to material and information, so that children cannot receive the material in its entirety, the unavailability of facilities and infrastructure that support the learning process, and children's listening and speaking activities are still limited (Anuar et al., 2021).

These problems can be overcome by learning by using 2-Dimensional Educational Game media. This process is expected to help increase the effectiveness of online learning at the kindergarten level, which can be seen from the increase in listening and speaking skills in learning materials.

1.2 Research Objectives

Based on the consideration of the phenomena above, the researchers are interested in conducting research that aims to determine the feasibility of interactive learning media 2-Dimensional Educational Games in increasing the effectiveness of learning in Kindergartens in Jepara Regency?

2. Methodology

2.1 Research Design

This 2 Dimensional Educational Game Media Development uses the steps of the Research and Development procedure (Sugiyono, 2016). The research and development cycle of the Gall & Borg (1996) model in Rohmaini et al. (2021), there are ten steps/stages in the procedure for implementing development research, namely: 1) research and initial information collection; 2) planning; 3) developing a hypothetical model/initial product format; 4) testing hypothetical model/initial product field; 5) revision of the hypothetical model/product; 6) limited field trial; 7) revision of the trial product; 8) trial/wider field; 9) revision of the model/final product; 10) dissemination and implementation. The ten research and development can be simplified into three stages, namely, preliminary studies, product development, and effectiveness testing.

2.2 Respondents of The Study

Sources of data in this development research include: material experts, media experts, teachers and students. The criteria possessed by the data source subject are as follows:

a. Validator/Expert of material, language and media in learning with doctoral education.
b. Kindergarten teacher who has a minimum of 3 years teaching experience, and a minimum educational background of S1.
c. Students and parents of kindergarten A and B students in four kindergartens in Jepara Regency, namely (Semai Kindergarten in Jepara Annual District, Baitul Makmur Kindergarten in Jepara, Mangun True Kindergarten in Kedung Jepara District, and Syaroniyyah Kindergarten in Pecangaan District, Jepara).

2.3 Instruments

The instruments used to collect data are observation sheets and questionnaires as presented in Table 1.

Table 1 - Grid of research instruments.

No.	Data	Data Source	Research Instrument
1	Dimensional Educational Game media design assessment	Expert	a. Material validation test questionnaire b. Media validation test questionnaire
2	The effectiveness of 2D Educational Game media to improve listening and speaking skills	Teachers, students and parents	a. Listening ability observation sheet b. Speaking ability observation sheet c. Teacher response questionnaire d. Questionnaire for parents' responses
3	Children's interest in learning	Parents	Student learning interest questionnaire

The listening ability observation sheet consists of indicators in listening, namely through the listening stage, understanding stage, interpreting stage, evaluating stage, responding stage.

The Speaking Ability Observation Sheet is composed of several indicators, namely the ability in accuracy of pronunciation, grammatical ability, vocabulary, fluency in speaking, mastery of topics in the learning process.

2.4 Analysis Technique

Data analysis in this study used descriptive analysis, t-test and N-gain. Descriptive analysis is used to provide an overview of the results of expert validation and describe the perceptions of teachers and parents regarding learning media. The effectiveness of learning is seen from the improvement of speaking and listening skills which are tested using the T-Test and N-Gain formulas. The T-test was used to calculate whether the increase in speaking and listening skills was significant or not, while the N-Gain was used to calculate the increase in speaking and listening skills.

3. Findings and Discussion

The results of the preliminary study show that many of the teaching materials used in Kindergarten in Jepara Regency still use conventional models. During online learning, the teacher only conveys material through the whatsapp group, then the parents carry out the teacher's orders to do their work. This method is considered less effective and seems monotonous, so that students become less interested in learning (Pratama et al., 2020).

Needs analysis is used as the basis for developing interactive learning media for 2-Dimensional Educational Games. This initial research and information collection phase includes analysis of teaching media and analysis of learning implementation.

The results of the analysis of teaching media needs can be obtained data as presented in Table 2. Based on these data it can be seen that the average student in the observed schools obtained a score of less than 3. This means that students are still not seen to be active in online learning. Students still have difficulty understanding the material being taught, so that learning media are needed that can improve listening and speaking skills in early childhood.

Table 2 - Results of observation of learning media needs.

No.	Ability	Mean	%
1	Listening ability	2.18	53.9%
2	Speaking ability	2.29	57.7%
	Mean	2.19	54.5%

The results of the development of interactive learning media of 2-Dimensional Educational Games for Kindergarten students were analyzed through three aspects, namely expert validation, teacher and parents responses, and the effectiveness of learning media. This game has passed the system testing stage and is in accordance with what is expected. The results of the validation data obtained from the three validators in the form of quantitative data using a Likert scale score are presented in Table 3.

Table 3 - Expert validation results.

No.	Expert	Mean	Category
1	Material	3.85	Very good
2	Media	3.51	Very good

The results of the validation data in Table 3, show that the assessment by the validator regarding the overall assessment of learning media is feasible to use with a little revision. The results of the validation of the interactive learning media of the 2-Dimensional Educational Game show that the learning media developed in this study were declared good based on expert validation.

Based on the results of the student response questionnaire, it can be seen that students gave a positive response to the interactive learning media learning 2 Dimensional Educational Game that had been given. This is because educational games can help the teacher's role in stimulating children's attention so that the learning situation becomes more fun. In addition, educational games can also help children's understanding in understanding the material presented so that children can store material longer and even store it permanently in their memory (Herniawati, 2019).

The results of the teacher's and parents' responses to learning carried out using interactive learning media 2-Dimensional Educational Games can be presented in Table 4.

Table 4 - Results of teacher and parents responses to interactive learning media 2-dimensional educational games.

Subject	Percentage Response	Description
Teacher	82,36	Very good
Parents'	84,4%	Very good

The effectiveness of the interactive learning media of the 2-Dimensional Educational Game is seen from two aspects, namely the learning outcomes of students who use learning media and the response of parents to these learning media in the learning process. Table 4 shows teachers and parents giving positive (good) responses to learning using interactive learning media 2-Dimensional Educational Game. Student interest in the experimental group was better than the control group.

Table 5 - Student interests.

Control			Experiment		
Mean Score	**Percentage**	**Category**	**Mean Score**	**Percentage**	**Category**
21	59%	Fair	27	75%	Good

The results of the effectiveness test of textbooks can be presented in Table 6. Based on the results of the learning effectiveness test above, it can be seen that learning with thematic learning media based on local wisdom of Jepara Regency can be said to be effective. This is evidenced by the results of the different test results that the experimental class students' learning outcomes are significantly better than the control class ($p<0,05$).

Table 6 - Learning effectiveness test results.

Aspect	Group			Conclusion
	Experiment	Control	t test	
Listening ability	Mean = 86,46	Mean = 76,45	P = 0,000 (p<0,05)	The listening ability of the experimental group students is better than the control class
Speaking ability	Mean = 83,12	Mean = 77,68	P = 0,001 (p<0,05)	The speaking ability of the experimental group students is better than the control class

The results of testing the effectiveness of learning are known that the listening ability of experimental class students who are taught using interactive learning media 2-Dimensional Educational Game is better than the control class. Interactive learning media of 2-Dimensional Educational Game is a technology-based learning media where technology is now very advanced and growing, making it easier in teaching and learning activities, so that learning is no longer a boring scourge, where by utilizing technology-based learning media, learning can be done anywhere and learning becomes more fun (Eka Jayanti et al., 2018)

Learning by using learning media in the form of games can affect students' learning motivation and along with that students' understanding will also be improved (Suryadi, 2018). The use of learning media in the teaching and learning process can (Suryadi, 2018). The use of learning media in the teaching and learning process can generate new desires and interests, as well as generate student learning motivation.

4. Conclusions and Recommendations

Based on the results of the study, it can be concluded that the interactive learning media of the 2-Dimensional Educational Game is declared feasible and can be used. This can be seen from the expert validation which states very well, as well as positive responses from teachers and parents of students. The interactive media of the 2-Dimensional Educational Game that has been developed is stated to be effective in improving listening and speaking skills, as well as children's learning interest. This is evidenced by the students' listening and speaking abilities in the experimental group which were better than the control class.

For further research in developing interactive media for 2-dimensional educational games, it is necessary to pay attention to the use of language that is easy to understand according to the age of the child. The material studied is closer to the life of early childhood.

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Conflict of Interest

The authors declare no conflicts of interest.

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