DEVELOPMENT OF AUGMENTED REALITY AS A LEARNING MEDIA FOR SBDP IN CLASS V STUDENTS MIN 4 JEMBER

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Abstrak

The existence of issues in the environment of arts and culture material learning activities using musical notation in primary schools is what spurred this research. Researchers created a learning medium based on the Android operating system because these learning activities did not receive positive feedback. 1) The development of augmented reality-based learning materials for fourth-grade elementary schools' arts and crafts classes that explore musical notes. 2) Another goal of this research is to ascertain how media experts and subject matter experts create learning media, and 3) how effective learning media implementation is. The research and development technique was employed in this study, and the end result is a product whose viability has been proven. (1) The design of instructional materials for augmented reality employing tools from Adobe Photoshop CC 2021, Adobe XD CC, Blender 3D, Unity 3D, Cubase 12 Pro, and Vuforia SDK (2) The results show that the Augmented Reality learning medium achieves 96.7% (in the small group) and 91.6% (in the big group), showing that it is very effective and well suited for usage as a learning medium. These findings led to the conclusion that this arts and crafts learning medium was effective and suitable for use as a teaching tool for elementary school fifth graders.

Keywords: Learning Media ; Augmented Reality ; Music.

INTRODUCTION

Anywhere and anytime, every human being has the right to education. The most important component in a person's life is their education(Kamiana, Kesiman, and Pradnyana 2019). Education allows one to grow and become a better version of themselves over time. Education is a necessity that cannot be ignored in anyone's life. As long as there is human life in the world, education will continue endlessly as times, lifestyles, and trends in life itself change.(Idrus and Yudherta 2016)

Education is a process of life, and not just preparation for life in the future, but education also aims to help humans in maturing the soul. Speaking of the soul, humans will actually continue to seek and try to create passion and maturity of the soul with whatever

they can do(Saputro and Saputra 2015). One small example is that humans will sing or play rhythms unconsciously to fulfill their soul needs. Singing is the work of the heart, which means that singing or more complexly known as music is an activity carried out by involving the heart, which in context is the human soul itself.

With the development of the sophistication of information and communication technology in the era of globalization, it encourages the world of education to make an innovation, one of which is by adopting Augmented Reality technology into learning media devices. Because it combines visual, auditory, and kinesthetic learning styles, the use of Augmented Reality technology in learning media can encourage students to use more of the five senses when using the application, making the learning process more interesting and fun and increasing the likelihood that the material will be accepted(Afifah, Widiyaningtyas, and Pujianto 2019). It is different from learning if only using pictures, books, or cards to help deliver material, students will only use the sense of sight not at the same time with hearing, while the art of music is a sound-based science and relies on hearing. Because it can present useful information, is easy to understand, and can directly show illustrations of the material presented, augmented reality technology can be used in the field of education in this context(Kurniawan 2017). Teachers of subjects that require visualization with the help of augmented reality find it useful compared to traditional learning. So Augmented Reality is suitable to be applied to music learning(Syamsudin 2022). The creation of learning media combined with technological advances will benefit all actors in the education sector, plus in this case the researcher plans to develop media based on the Android system which is already very popular and so easily accessible to all levels of society unlike other system bases which are considered to have a very expensive price(Arifin, Pujiastuti, and Sudiana 2020).

The art of music is a free art but of course to create a beautiful harmony so as to create a good atmosphere for the development of one's mental maturity is when the music is played according to what it should be(Nurdiana 2020). Music has some connection with the purpose of national education itself, which education aims to produce a creative generation. If we look back the word creative comes from English Creat which means make / create.

Then the word make or create this when reviewed in KKO is included in the cognitive domain with the highest level.(Utami, Rukiyah, and Andika 2021) This makes the ability to make music will boost the ability to create to lead students' cognitive competence to the highest level. The world of music has rules that bind each player in order to create a rhythm, a tone that brings harmony as expected. An example is song sheet music.

Based on the results of an interview with one of the teachers at MIN 4 Jember. overall grade 5 students at MIN 4 Jember do not understand how to read block notes either as a whole or note by note. The homeroom teacher of grade V MIN 4 Jember said that her students did not respond to the beam note material even though learning occasionally directly used musical instruments such as pianika but students recognized beam notes only to the extent of the difference with number notes. For this reason, the 5th grade homeroom teacher at MIN 4 Jember needs and supports the development of learning media to help increase students' interest in this beam note material and to facilitate the delivery of music material on beam notes immediately and in the future..

METODE

This research uses the Research and Development method. this research method is a research method used to produce certain products, and test the effectiveness of these products. Research and development methods in educational research require researchers to produce efficient products or services related to pedagogical or educational practices(Hurrahman et al. 2022). Research activities mean searching intends to search and explore user needs analysis while the meaning of development is an activity that can produce a learning device that is validated by both material experts and media experts.

The type of data in this study is quantitative data built from primary data and secondary data. Primary data is the main data, in this study primary data is data obtained from questionnaire instruments for the validation process by material experts and the validation process by media experts, as well as the results of small and large group tests in the form of scores(Ritonga et al. 2022). Then secondary data is data that supports information obtained from primary data. In this study, secondary data is data obtained from

interviews with researchers to media experts and material experts. Sources of data in this study were obtained from questionnaire instruments of the validation process by material experts and the validation process by media experts, as well as the results of small and large group tests in the form of scores, as primary data on the development of learning media with Augmented Reality technology, while secondary data was obtained from interviews with researchers to media experts and material experts.

A study certainly has a way for researchers to collect the data needed in their research. The data collection techniques used in this study are interviews and questionnaires. Researchers obtained information and direction from material experts and media experts by asking several questions and discussing during the validation process with expert validators regarding feasibility both in terms of material and media. This interview was conducted to media expert validators and material expert validators(Nasution, Darmayunata, and Wahyuni 2022). In this study, several questionnaire instruments were also used which were compiled based on the media and material aspects themselves.

The results of interviews and instrument sheets that have been filled in by expert validators are then processed and grouped based on good and feasible categories as a learning media and then conclusions are made so that it will be easy to understand(Hikmah and Kanzunnudin 2023). Raw data will be obtained from a rating scale (questionnaire technique) in the form of numbers which are then analyzed and converted into qualitative terms. The data analysis technique used by researchers on the results of expert validation is to use a Likert scale. the Likert scale is used to determine the intensity of certain stances and attitudes.

The data obtained from media expert validators and material expert answers on the instrument sheet are then calculated using the average formula, which is as follows:

$$\text{Average formula } \bar{X} = \Sigma x/n$$

Keterangan:

$\bar{X}$ = Average Value

Σx = Value acquisition

n   = Number of assessment aspects(Sugiyono 2013)

The following is a Likert scale conversion table that will be used as a reference in determining media criteria in material aspects

Table 1. Likert Scale Conversion

Score	Range	Criteria
5	$x > 4.2$	Very Good
4	$3.4 < X \leq 4.2$	Good
3	$2.6 < X \leq 3.4$	Enough
2	$1.8 < X \leq 2.6$	Lack
1	$X \leq 1.8$	Very Lack

Then to find out the feasibility level of Augmented Reality learning media then conducted validation to media experts. After conducting the validation process to media experts, the average calculation results of the media expert validation instrument sheet are classified based on the Likert scale table of feasibility level to determine whether or not the media is used. The Likert scale table used is as follows:

Table 2: Likert Scale of Feasibility Level

Score	Range	Criteria
5	$X > 4.00$	Worth
4	$3.49 < X \leq 4.00$	Worth
3	$2.99 < X \leq 3.49$	Not Worth
2	$1.99 < X \leq 2.99$	Not Worth
1	$1.00 < X \leq 1.99$	Not Worth

Then processing the data obtained from the students' responses to the media tested both in large groups and small groups using a reduced Likert scale where the instrument answers only provide two answer options, namely "YES" or "NO" with the lowest score of zero and the highest score of one. The response results in the small group trial and large group trial were processed with the following formula

$$X = \frac{Jumlah\ penilaian\ seluruh\ siswa}{penilaian\ sempurna} \times 100$$

Based on the above formula that "X" is the percentage of scores obtained from the calculation of student responses to learning media and the results of working on quiz questions on Augmented Reality learning media then categorized based on the following percentage table:

\Table 3. Media category percentage table

Range Score	Category
81% - 100%	Very Good
61% - 80%	Good
41% - 60%	Enough
21% - 40%	Lack
0% - 20%	Very Lack

Based on the formula above that "X" is the percentage score obtained from the calculation of student responses to learning media and the results of working on quiz questions on Augmented Reality learning media then categorized based on the following percentage table:

Table 4. Media feasibility category percentage table

Range Score	catergory
81% - 100%	Very Worth
61% - 80%	Worth
41% - 60%	Enough
21% - 40%	Not Worth
0% - 20%	Very not Worth

HASIL DAN DISKUSI

Result

The design or design of Augmented Reality learning media developed on the material of note duration and silent duration of fourth grade cultural arts and crafts subjects using Adobe Photoshop CC 2021, Adobe XD CC, Blender3d, Unity3d, Cubase 12 Pro, and third party applications such as Vuforia SDK, and Virtual Music Instrument. It consists of the main screen, menu screen, information screen, and Augmented Reality screen.
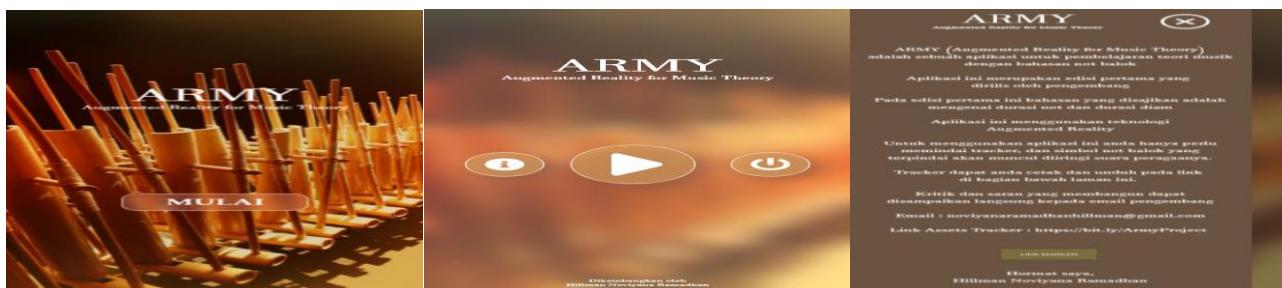
Basically, the working principle of Augmented Reality is tracking and reconstruction. reconstruction(Perdana* and Rosana 2023). At first markers are detected using a camera. How to detection can involve a variety of algorithms, such as edge detection, or other or other image processing algorithms. The data obtained from the tracking process is used in reconstruction of the coordinate system in the real world. Besides adding objects to the real environment, Augmented Reality can also can eliminate real objects in virtual form.(Muhayat et al. 2017) By covering the real object by covering the real object with a graphic design according to environment, then the real object will be hidden from the user. The real object and the marker that has been installed will be detected by the camera, then information from the camera is forwarded to the system in the form of camera position, which contain graphics of virtual objects(Saurina 2016). Information in the form of video of the real object is forwarded to the video compositing. In the graphics system, the camera position determines the viewing angle of the virtual object to be displayed. In video compositing, information from the graphics system is merged with real video from the camera. The merged result will be displayed on the smartphone screen that screen that is already in the form of Augmented Reality.

Before making learning media, there are stages that must be done, to produce media that can cover shortcomings of the trainer or practicum module that used as well as being able to reach all students. Stages that need to be considered in making learning media are: 1) determine the concept and form of learning media concept and form of learning media, 2) determine the basic competenciesthat students will achieve, 3) determine the material that will be contained in the learning media, 4) determine the evaluation used to determine the extent of the success of the learning media learning media used(Untari et al. 2022). In

this case, making learning media using Augmented learning media using Augmented Rreality, some software and hardware as support

Discussion

After the process of designing and making learning media is completed, the researcher then makes a validation instrument sheet for the validator which aims to develop the learning media made. the results of the material expert validator assessment obtained a total score of 42 out of a maximum score of 45 and if calculated on average Augmented Reality learning media can be categorized as very good with an average of 4.7. In the assessment process, expert validators provide advice for researchers in particular and generally for the users of this learning media to adjust to the thematic learning system. Then the results of the assessment of media expert validators in this study found that Augmented Reality learning media got a total score of 63 from a maximum score of 65 and can be categorized as feasible as learning media with an average value of 4.85. Media expert validators provide suggestions for improvements or revisions to the marker design for this application to add information on the top and bottom of the marker to help facilitate users in using this augmented reality learning media application.

The first trial that took place was a small group trial of six students out of a total of 25 students in class five A MIN 4 Jember. This trial was conducted in groups. Students consisting of three boys and three girls were formed into two groups separated by their gender. After that they were given the opportunity to try out the learning media application developed by the researcher. After that, each of them was given a questionnaire to find out the response related to this learning media application.

The total score obtained from six students is 60 out of a maximum score of 60 as well. Then the average feasibility of the researcher's application is calculated based on the questionnaire score with the formula discussed earlier and gets a score of 100 which means it is very feasible as a learning media. In this small group trial session, students were very enthusiastic in using this application. The researcher then gave an evaluation sheet consisting of five questions related to the material from the application and it was found that the number of scores obtained was 29 out of a maximum score of 30, this number of

scores was calculated as a percentage and then an average of 96.7 was obtained so that when referring to the feasibility table previously discussed, it got a very good category as a learning media.

The next trial was a large group trial at the same school but with a different class Based on the results of the large group questionnaire, it is known that the total score is 229 out of a maximum score of 250 as well so that out of 25 students an average score of 91.6 is obtained which these results fall into the category of very feasible as learning media. This can be seen with the enthusiasm that scrambles to try to operate the application that was tested on them. Then in terms of the evaluation results presented in the table above shows a score of 108 from a maximum score of 125 resulting in an average percentage of 86.4 and shows that Augmented Reality learning media is categorized as very good to operate as a learning medium.

The implementation of Augmented Reality-based learning media in the subject of cultural arts and crafts of beam note material MIN 4 Jember is carried out in two stages, namely the first stage of small group trials carried out in class Five and then the second stage of large group trials conducted in class four B. In each group trial session, students are required to fill out a questionnaire and evaluation questions given. When the application trial was held, the enthusiasm of students to try to operate this learning media application was so high. Augmented reality technology is something new they see and feel in learning activities, making curiosity and interest appear quickly in each student(Hapsari, Toenlioe, and Soepriyanto 2018). Based on the results of this trial, it is known that Augmented Reality-based learning media is declared very good and very feasible to be used as learning media.

KESIMPULAN

The design or design of Augmented Reality learning media developed on the material of note duration and silent duration of fourth grade cultural arts and crafts subjects using Adobe Photoshop CC 2021, Adobe XD CC, Blender3d, Unity3d, Cubase 12 Pro, and third

party applications such as Vuforia SDK, and Virtual Music Instrument. Consists of the main screen, menu screen, information screen, and Augmented Reality screen.

The development carried out on Augmented Reality learning media developed on the material of note duration and silent duration of Fifth grade cultural arts and crafts subjects was validated by two experts, namely material experts and media experts. Based on the direction of the media expert validator, the application marker to be changed or added position marker signs which will certainly facilitate application users in the marker scanning process is carried out. Special changes are also given to three markers that have a little graphic complexity which results in less responsive learning media applications when scanning markers.

The implementation of this learning media was carried out in the Fifth grade MIN 4 Jember Regency. The implementation is divided into two stages, namely small group tests and large group tests and from both get results stating that the Augmented Reality learning media developed on the material of note duration and silent duration of cultural arts and crafts subjects are very good and very feasible to use as learning media.

Based on research that has been conducted on the development of Augmented Reality learning media developed by researchers on the material of note duration and silent duration of fifth grade cultural arts and crafts subjects are as follows.

For researchers, it is expected to perfect the Augmented Reality media that has been developed so that it becomes better and more accessible to the wider community as a technology-based learning media for students in learning activities.

For fourth grade students, it is hoped that Augmented Realty learning media can be utilized in learning activities both at school or at home so that learning activities become more varied and enjoyable with the presence of technological advances.

For schools, it is expected to be a learning media facility that can be used during teaching and learning activities.

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