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Development of Local Wisdom Augmented Reality (AR) Media in Elementary Schools

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Abstract

This research is what research, the media slackens at the time of the pandemic. Augmented reality media is a good student in scorn. Which media can be framed to increase cpi until now independent at home? To be able to re-attract this media disikamati local wisdom Pencak silat content and thematic integrated know Natural Sciences (IPA). In the generation of research and development of models of several types. Which model is the 4-D model? The model developed by this 4D development model consists of 4 main stages, namely: Define, Design, Develop, and So on. These methods and models were chosen because for products that result in augmented media reality. Products that develop trials with validity and product trials to know the results of self-reliance learning and learning learners were learning to use augmented reality media-based Pencak silat on human blood matter material. The evaluation results showed the quality of media by material experts classified as an excellent category with a score of 83.5%. Media quality by linguists is excellent with a score of 89.55%. Media quality by media experts is classified as very good with a score of 85%. Teacher response test results fall into the excellent category with a score of 86.93%. Based on the percentage of score acquisition can be concluded that integrated thematic AR media and local wisdom Pencak silat deserve to be used in learning activities.

Keywords: *Augmented Reality Media; Integrated Thematic Pencak Silat; Elementary School*

Introduction

Student health problems are also a topic in this study, in addition to the findings of the above problems researchers also found problems in human circulatory learning during the covid 19 pandemic. Blood circulation is found in grade IV elementary school materials. According to Deng et al., health in sports education, which requires important interaction between teachers and learners, because physical education plays an important role in relieving pressure not only on the body but also on the mind (Deng et al., 2020). Therefore, web-based physical education can last for a relatively long time in the future. The same is found in Dunton et al. that spread of COVID-19, restricting learners from engaging in levels of physical activity, maintaining health, and preventing disease (Dunton et al., 2020). More in-depth by Fung &Pun, the learning activities are more important to prioritize sports activities, exercises, and physical activities is martial arts during the pandemic (Fung & Pun, 2021). Not only that martial arts are a form of network that is not very regulated ranging from the introduction of informal identity to inter-

cultural to know and develop local wisdom about culture for elementary school students. In line with Veerendra's opinion that all learners should be allowed to cooperate and compete in physical activities (.Veerendra, 2020). Both are important life skills, and both can be fun. Our students must graduate with an understanding of the core principles of fitness and nutrition. They must tell other friends about activities, nutrition, and fitness, and students are prepared to assume personal responsibility for their health through prevention so as not to affect students' independence (Asrifah et al., 2020; Suryanto et al., 2017).

The decline in independence and health of students during the pandemic was discovered by researchers at an elementary school in Bekasi City. One of them is at SD Negeri Aren Jaya XVIII. At the time of the researcher's initial observations on distance learning. Making 80% of students difficult to integrate subject content. 78% of media are less interesting and boring so that students are more likely to ask for the help of parents of students the quality of students' independence decreases. The process of online learning in the education system requires a design and instructional approach to transformation in education (Setiawan & Iasha, 2020b, 2020a). Social distancing methods between students and teachers to avoid virus contamination in the Current Covid 19 pandemic lead to a decrease in the character of students (rahmad, 2021; Setiawan et al., 2020).

In line with Yang et al.'s opinion, the ongoing COVID-19 pandemic resulted in a shift of traditional instruction to online learning activities (possibly temporary), and many students were unable to participate in practical activities and resulted in unprecedented disruption to the entire community and education system (HARSANTI, 2018; Yang et al., 2020). The same problem in the research of Amos et. al. in the era of the COVID-19 pandemic that students can no longer do face-to-face learning, so many innovative developments in the teaching and learning process are increasing with the aim that students can still follow the learning even online (Amos Ochayi Onojah & Adenike Aderogba Onojah, 2020; Iasha et al., 2020). The problems that occur in the learning activities during the covid pandemic are taken as problems that will be developed in this study (Acesta et al., 2021; Setiawan et al., 2021). Of course, problems with the health of learners also need to be considered in addition to preparing learning activities that adjust to special circumstances such as Dewey's philosophy that emphasizes the importance of learning about the health of the body as a way in which learners can learn to adapt to the conditions of the environment experiencing special circumstances (Jennings, 2020; Juniarso et al., 2020).

Based on the problems and opinions above the role of interactive learning media is very important. Therefore, researchers raised augmented reality media based on local wisdom Pencak silat in human circulatory material. Novelty in this study is the development of Augmented Reality (AR) with local wisdom Pencak silat to increase the independence of students in the mix with integrated thematic learning to contribute to students in the new normal pandemic covid 19. State of the art research is the result of studies including character education by Bona Ventura (2020), The latest trends Pencak silat and health while Augmented reality-based wisdom as a comparison of differences in previous research (.Veerendra, 2020; Pramujiono et al., 2020).

The strengthens the research to be more interesting researchers combine Pencak silat with human circulatory metering learning that requires media in real form with the movement of Pencak silat movement that can bring learners into good and correct health literacy during this pandemic (Sudrajat et al., 2018). Media based on local wisdom Pencak silat is expected to help students in solving the problem of independence of learners' independence to the parents at home learning. This media can also be learned by students if they get a clearer step of learning guidance (Rachamatika et al., 2021; Sudrajat et al., 2021).

The findings of the field study reveal augmented reality technology(AR) as a tool to improve the success of learning as well as low-cost AR media to provide information in this pandemic period where students do not go to school so that when students process information and communicate less maximally.

With demikian researchers further develop integrated thematic learning media based on local wisdom Pencak silat.

1. Methods

This research uses Research and Development (R&D) methodology. The goal is to develop Android-based applications with augmented reality technology capabilities. The application was developed using Thiagarajan (Peranginangin et al., 2019). The three main stages are Define, Design, and Development.

The instrument used to measure product quality is a questionnaire. The questionnaire consists of expert validation questionnaires and teacher questionnaires. The expert validation questionnaire was adapted from development research conducted by Almaiah et. al. while the teacher response questionnaire was adapted from Cheng &Tsai (Almaiah et al., 2016; Cheng & Tsai, 2013). Aspects of expert validation measured in this study are: 1) System Quality consisting of functionality, accessibility, interactivity, ease of use, and interface design; 2) Service Quality consists of availability, personalization, responsiveness; 3) Quality of Information consisting of the use of content and the adequacy of content; Then 4) aspects assessed in augmented reality systems consisting of application performance, 3D models, marker quality, and information delivery. While aspects of user response in this study include the use in learning consisting of satisfaction, enjoyment, entertainment, relief, motivation; and usefulness consisting of effectiveness, efficiency, and safety. The results of expert validity in the form of suggestions and inputs are analyzed using qualitative descriptive techniques while the results of the assessment of questionnaires in the form of scores from each expert are analyzed using quantitative descriptive techniques with Sugiono's formula (i)

$$P = \frac{\sum \text{Number of Questionnaire Answers}}{\text{N}} \times 100\% \quad \text{(i)}$$

Information
P = Percentage of valuation
N = Number of Questionnaire Items

(Sugiyono, 2018)

The calculation results are then identified by the standard assessment category and decisions are made for product revisions. The standard category of assessment is presented in table 1.

Table 1. Decision making for revision

Achievement Level	qualification	explanation
81-100	Worth using	Not Revised
61-80	Worth using	Not Revised
41-60	enough	Fixed
21-40	Buruk	Fixed
0-20	It's So Bad	Fixed

(Sugiyono, 2018)

The participants involved are 1 (one) media expert, 1 (one) material expert, 1 (one) linguist,3 (three) grade 5 teachers.

2. Results and Discussion

The results of the study in the form of learning media products based on android with augmented reality technology. The application contains a simulation of various virtual 3D objects that will appear when the application detects the specified marker. The 3D virtual object simulates the integrated thematic of Natural Sciences (IPA) about human blood circulation and local wisdom of Pencak silat that covers the basic movement of Pencak silat to the workings of the heart, human blood circulation, kicking and fending movements, circulatory disorders, and others. The application is stored in the form of APK files that can be deployed in various online class applications.

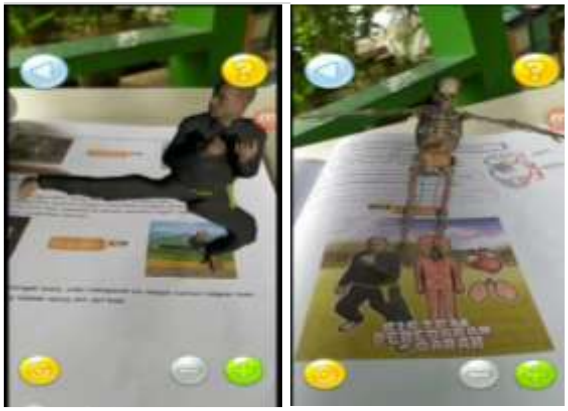

Figure 1. Integrated thematic augmented reality model Pencak silat

Freshwater Gastropod application development procedure using 4D model consisting of Define, Design, Development, and Dissemination stages. The Disemiphase of rice is carried out in separate field research activities. A detailed description of the stages in this study is as follows:

Define Phase

Procedure for Developing the Stage of Definition is useful to determine and define the needs in the learning process and gather various information related to the product to be developed. This stage is divided into several steps, namely: Front-end Analysis is conducted to find out the basic problems and needs in the development of augmented reality media based on Pencak silat at SDN Aren Jaya XVIII. In this particular situation, of course, many students have difficulty in delivering materials because students do not directly come face to face in learning. Task analysis aims to identify the main tasks that will be performed by learners. Task analysis consists of the analysis of Core Competencies (KI) and Basic Competencies (KD) related to materials that will be developed through augmented reality media based on Pencak silat on human trafficking material.

Design Phase

The Design Stage is the design stage of the prototype of learning media products based on augmented reality technology. The design stage goes through several stages: Creation of Criteria Reference Test, Media selection, Format Selection, Initial Product Design. The stage of designing a data collection instrument containing items that measure the quality of integrated thematic ARmedia Pencak silat. This questionnaire was adopted from Almaiah, Masila, Jalil, &Man while the questionnaire to collect data from material experts and media system experts was adapted and developed by researchers. Media quality is seen from System Quality, Service Quality, Information Quality, and Augmented Reality System Quality.

Table 2. Mobile Learning Augmented Reality app assessment aspect grid.

Number	Dimension	Aspects	Description
1	System Quality	Uses	App capabilities run smoothly on a variety of Android-based smartphones
		Accessibility	Ease of application accessible to students
		interactivity	App capabilities to facilitate various interactions with other users
		Easy to use	Application operability for users
		Interface design	The appeal of layout and interface design in mobile learning applications for its users
2	Quality of Service	availability	Ease of application to access anytime and anywhere
		Personalized	App capabilities provide learning resources related to student needs
		Responsiveness	The speed at which the application is accessed
3	Quality of Information	Usability Content	Accuracy and ease of information for students to understand
		Content Adequacy	The adequacy of content corresponds to the level of educational students.
4	Augmented Reality Application System Quality	performance	App capabilities can run smoothly on students' smartphone devices
		3D Models	The capabilities of 3D models appear, follow the movement of markers, and support interactivity with the user.
		Marker Quality	Quality of markers in encoding information detected by the application
		Information delivery	Quality of the model in presenting information

In addition to the assessment instrument validator also developed a teacher response instrument. The assessed aspects of the teacher response questionnaire are user experience and media use. Media to carry out the learning of electronic media that is widely used by students, namely mobile phones. Of course, this phone makes it easier for students to learn independently based on the materials developed. Multimedia self-learning is a programmatic training format so that students can learn independently by following the audio and visual learning guidelines contained in the media. The process of developing 3D models begins with the analysis of basic competencies of the integrated thematic content of human blood distribution lessons and the local wisdom of Pencak silat. Then continued with the development of indicators. Each indicator is used as a basic reference for designing 3D models. The design of 3D models is contextually designed so that they can be associated with the daily lives of students.

The Develop stage is the evaluation stage of product prototypes performed by expert validators. Expert validators consist of media experts, material experts, linguists. Validators are those who have expertise in every field assessed so that the results of the evaluation of validators can be accounted for scientifically in every aspect. The evaluation results of validators are shown in table 3 through Table V.

Table 3. Assessment results of matter experts in every aspect

Dimension	Aspects	Score In Every Aspect	Maximum Score	Percentage
System Quality	Uses	10	12	83
	Accessibility	9	12	75
	interactivity	13	16	81,25
	Easy to use	10	12	85
	Interface design	13	16	81,25
Average Aspects of The System Quality				**81**
Service Quality	Availability System	7	8	87,5
	Personalized	10	12	83
	Responsiveness	7	8	87,5
Average Aspects of Total Service Quality				**86**
Total		79	96	83,5

As can be seen in the table above material experts give a score close to the maximum on a dimension of system quality consists of five aspects with an average aspect of 81 %. Based on the results of the trial conducted, it can run smoothly on various types of Android Phones. AR media is run with a mobile phone with characteristics easy to carry and moved from one place to another. But of course, not all students use it efficiently because about 3% of all students used mobile phones alternately with their sister or sister. Furthermore, it doesn't require too much syntax, advertising, or settings. Aspects of interface design show. The aspect of Personalization that obtains a score almost to the maximum shows that the media can provide high student learning resources. The material is displayed in an audio-visual format. AR media simulates objects that students find difficult to find in a real environment. Thus, the media makes it easier for students to learn and understand the material. The responsiveness aspect measures the speed of media performance when run on mobile phones. A high score indicates media run quickly when operated. Overall, the media has a high system quality and service quality with a score of 83.5%.

Table 4. Language expert assessment results in every aspect

Dimension	Aspects	Score in Every Aspect	Maximum Score	percentage
Quality of Information	Material usability	21	24	87.5
	Language Literature	22	24	91.6
Total		43	48	89,55

The table above shows the results of ar media evaluation by material experts. Material experts assess the media with a focus on the quality of the information delivered. AR has quality information if information submitted through the media is useful to students. In addition, the information submitted is under the level of education of students. Based on the assessment of material experts it can be known that the total score given by linguists is 89.55%. This score belongs to a very good category so there is no need to revise.

Table 5. Results of the assessment of media experts in every aspect.

Dimension	Aspects	Score	Maximum Score	percentage
Augmented Reality Systems	Application performance	18	20	90
	Quality of 3D models the	14	16	87,5
	quality of the marker feature	19	20	79,16
	Outline information		8	75
Total		51	60	85

The table above presents ar media assessment data by media experts. Augmented reality experts assess the performance of apps while running on mobile phones and the quality of 3D virtual models in terms of resolution. The results of augmented reality expert assessments show that the percentage of scores obtained from augmented reality system experts is 85% belonging to the Excellent category.

After the validation process, the next step is to test the practitioner's response. The response test was conducted on 2 grade V teachers and 1 sports teacher. The results of the teacher response trial are presented in the table below which shows the data of the test results of the application usage response by the teacher. The assessed aspects are user experience and usability. The user experience assesses the experience that teachers feel when using the app. The results showed that teachers were happy and entertained while running AR. The application can also increase learning motivation. The usability aspect assesses the user's response in terms of effectiveness when used, or, for efficiency and safety. In addition, the icon is also easy to remember. The results showed that teacher test scores of 86.93% fall into the excellent category.

Table 6. Results of teacher responses to products

Dimension	Aspects	Score	Maximum Score	percentage
User experience	Satisfaction	18	20	90
	Entertainment	21	24	87.5
	Delights	19	24	79,1
	help	19	24	79,1
	motivation	21	24	87,5
	Support creativity, Reward	22	24	91
Uses	Effectiveness	20	24	83,33
	Efficiency	22	24	91
	security	22	24	91
	Utility	32	36	88.8
	Learning ability	31	36	86,11
	Memory	32	36	88.8
Total		279	320	86,93

Augmented reality media is very useful in the learning process during the pandemic can increase the independence of students (Herlandy et al., 2020) refers to the reference, the nature of learning media is to help students learn more actively. Then, students are stimulated to find the concept independently even without the presence of the teacher. Finally, augmented reality media can provide learning anytime and anywhere (flexibility).

The advantage of augmented media compared to other learning media is that it can visualize abstract concepts into concrete concepts and as if they can be understood. Many scientific objects are so small that they are difficult to see in person or even so large that they are impossible to present in the classroom. By utilizing augmented reality-based media provides solutions to the problem.

The drawback of AR media based on augmented reality technology is that its operation still requires additional design and application. The system does not support automatic renewables. If there are improvements or additions must start from scratch. The creation of this medium must be carefully crafted in designing requires special skills.

Conclusion

Research development Research and development (R&D) develop products in the form of integrated thematic learning media based on local wisdom Pencak silat in elementary schools. The

development model used to develop products is 4D consisting of Define, Design, Develop, and Dissemination. The evaluation results showed the quality of media by material experts classified as the very good category with a score of 83.5 %. Media quality by linguists is very good with a score of 89.55%. Media quality by media experts is classified as very good with a score of 85%. Teacher response test results fall into the excellent category with a score of 86.93%. Based on the percentage of score acquisition can be concluded that integrated thematic AR media and local wisdom Pencak silat worth using in learning activities.

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