New Smart Augmented Reality Content to Improve Student Learning Activities in Chinese Language

Sunarti[(1)], Herri Akhmad Bukhori[(2)], Tiksno Widyatmoko[(3)], Amira Eza Febrian Putri[(4)]

Universitas Negeri Malang
Jl. Semarang No.5, Sumbersari, Malang, Jawa Timur – Indonesia

Email: sunarti.fs@um.ac.id, [2]herri.akhmad.fs@um.ac.id,
[3]tiksno.widyatmoko.fs@um.ac.id, [4]febrian.putri.fs@um.ac.id

Available Online
http://www.jurnal.unublitar.ac.id/index.php/briliant

History of Article
Received on 2 January 2022
Accepted on 28 May 2022
Published on 29 May 2022
Pages 384-390

Keywords:
Augmented reality; learning activities; Chinese language

DOI:
http://dx.doi.org/10.28926/briliant.v7i2.927

Abstract: This study focuses on the development of AR-loaded Listening teaching materials. Based on the results of observations and interviews at the Mandarin language education at Universitas Negeri Malang, it was found that some students felt less interested in the learning model that used printed books provided by the school. In addition, teachers of related subjects also stated that the available learning tools were limited. This research and development use the ADDIE model. Observations and interviews were used to collect the initial data of the study. The sample of the trial subjects of this study were students of the State University of Malang. Research data collection was carried out using questionnaires and observation sheets. Based on the results of field trials, this research and development resulted in a product in the form of digital teaching materials with augmented reality (AR) content which was declared very suitable to be used as teaching materials and could be used in the learning process to foster learning activity with a percentage score of 86.3%.

INTRODUCTION

Teaching materials are one of the important learning tools, both for teachers to prepare the learning process, and for students to achieve the expected competencies (Cunningsworth, 1984). Teaching materials are one source of learning in the form of concepts, principles, definitions, content or context groups, data or facts, processes, values, abilities, skills that are designed and developed to achieve learning objectives according to the needs that must be achieved by students(Howard,2004). In the process of making teaching materials, you can take advantage of currently developed technology, such as renewable technology, namely the use of augmented reality (AR) technology (Irwansyah, 2018).

One of the subjects that has an important role in skill competence in Mandarin is the subject of Listening. The subject of Listening aims to make students able to recognize, understand, and practice knowledge of Mandarin. In the Listening subject, there is material about process devices, storage media, and the layout of computer components (Golonka, 2014). Based on the results of observations and interviews with several students at the Mandarin language school of Malang State University, it was revealed that students had difficulty understanding the material

for one of the process tools, causing students to feel less interested and less active in learning[6].

The teaching materials and tools used are printed books and blackboard media plus the lecture method (Grigoryeva, 2015). The use of these teaching materials is considered insufficient to explain and illustrate material about process devices, storage media, and computer layout. This is supported by not daring students to try to explore computer devices during practicum (Zhou, 2013).

Based on these learning activities, students become less active and only listen to the materials presented by the teaching teacher. To foster activeness, curiosity, and clarify in the understanding of listening material, it is necessary to support visualization technology (Sunarti, 2020) that can be applied in the learning process of process equipment, storage media, and layout of computer components. One solution to this problem is the use of technology that can arouse students' interest in visualizing process devices, storage media, and computer layouts, namely AR technology (Turco, 2014).

AR is a technology that combines two-dimensional or three-dimensional virtual differences into a real environment and then projects these virtual objects in reality in real-time (Wu, 2013). AR is the latest technology that allows users to visualize the virtual world as from the real world that is around them effectively to make the real world seem connected to the virtual world where interactions can occur between the two (Lee,2012).

Based on this problem, this research develops an application that learning of listening material containing AR based on android. This application will be made using Unity and Blender to create models of computer hardware peripherals in the form of 2D and 3D and Vuforia to track markers (Kesim, 2012). In addition, this application will use the Android smartphone camera to detect 2D and 3D models that are used as markers. The benefits of mobile AR-based teaching materials include users being able to operate this application whenever and wherever independently(Chen,2017) so that it can adjust to the learning speed of each student, there are interactions tailored to user needs, there are images or videos that can be viewed.

According to the side taken so that it can attract students and provide a real picture of process devices and various computer hardware peripherals. It is hoped that this application can be used as starting material for Listening subjects which can trigger student interest in the learning process.

METHOD

The development of this learning material is carried out based on the ADDIE development model. This is because the ADDIE development model has simple, concise, and clear stages (Sunarti,2021). In addition, the time required to conduct research is relatively short, so this model makes it easier for developers to conduct research. Therefore, this development model is suitable for the development of teaching materials using AR technology, which is the ADDIE development model (Branch,2009).

ADDIE (Analysis- Design- Develop- Implementation- Evaluate) development model. The stages of research and development of ADDIE according

to Branch [15-16]consist of five phases, namely analyze (analysis), design (design), develop (development), implement (implementation), and evaluate (evaluation). The ADDIE research and development model in the application of teaching materials containing AR was chosen because its development is more system-oriented. The stages in the ADDIE model are shown in Figure 1.

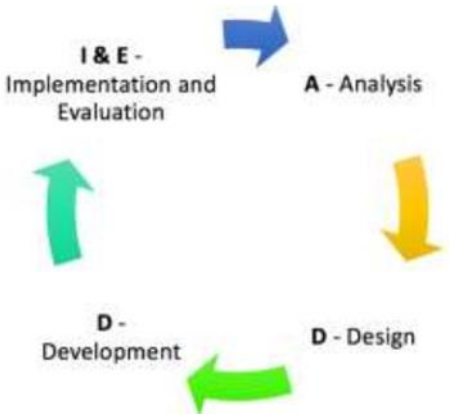

Figure 1. Stages in this research

a) Analyze stage

At this stage, identification of needs and identification of problems in the field is carried out to obtain solutions to these problems. This stage is carried out by teaching Mandarin at the State University of Malang by using direct interview techniques to influential teachers in the subject of Listening and teaching Mandarin at the State University of Malang. The following is a table of interview instruments for influential teachers in the subject of Listening and Mandarin students at the State University of Malang.

b) Design stage

At the design stage, it is related to the application system that you want to make that has been adapted to the needs of the previous stage. the flow of research and development of digital teaching materials Listening to AR content to foster active learning of Mandarin students at the State University of Malang.

c) Development stage

At this stage, the development of teaching materials containing AR is carried out with designs that have been prepared at the design stage. The development uses Unity and for the manufacture of 2D and 3D objects using Photoshop and Blender. In the development of the application, it will be equipped with a rotation button to be able to see objects from all sides. Listening teaching materials will be prepared following the 2013 curriculum. In the development process, media experts will be assisted, then the application development will be reviewed by a team of experts and tested on application user respondents, which aims to find out the shortcomings of this application and to get criticism and suggestions. useful for building Listening teaching materials with AR content so that these teaching materials are feasible for implementation to the target users of this application.

d) Implementation stage

At this stage, everything that has been done at the analysis, design, and development stages will be implemented in the form of teaching materials and AR applications in the form (.apk) which is then continued to be used as teaching materials to support teachers for the learning process of Listening subjects to be taught Mandarin. Malang State University aims to increase student learning activities.

e) Evaluation stage

At this stage, the evaluation process of AR teaching materials that have been developed is carried out. This is a stage to see whether the product of this teaching material is to make the product or not. The evaluation of this teaching material uses a questionnaire containing several questions that are shown to media experts, material experts, and students to meet revision needs. The revision aims to improve and refine AR teaching materials if there are errors or deficiencies so that they can meet the expected product criteria.

The product trial in this study was conducted to collect data that was used as a basis in determining the feasibility of the product being developed. In this section, the things that must be considered are: (1) trial design, (2) test subjects, (3) types of data, (4) data collection instruments, and (5) data analysis.

RESULT AND DISCUSSION

The data analysis technique for the activity test data is to use an observation sheet. Aspects measured on student activity are (1) emotional aspect: students dare to express their opinions in front of the class, (2) listening: students listen when the teacher explains the material and the use of AR teaching materials, (3) mental: students actively work together to solve problems. problems, (4) oral: students ask questions or responses during the learning process, (5) visual: students pay attention to the teacher's explanation about the use of AR teaching materials, (6) writing: students work on assignments in AR teaching materials, and (7) metric: students are active in practicum and explore AR teaching materials. This observation sheet is to uses the percentage of activeness of each student. Calculation of the percentage of student activity data in the learning process is calculated using the following formula :

$$V = \frac{Tse}{Tsh} \times 100\%$$

Information:

- Validity based on a percentage
- Total Score
- Max Score

$$V = \frac{\sum Tse}{\sum Tsh} \times 100\%$$

Information:

- Validity based on a percentage
- Total Score
- Max Score

The resulting development is AR Loaded Listening Teaching Materials. Digital Listening Teaching Materials containing AR in the form of a mobile application with a .apk extension. This teaching material was developed using AR technology which can be the application to an android smartphone. This application development uses the ADDIE development model which has been described in the method. The results of the development of AR-loaded Listening digital teaching materials showed in figure 1.

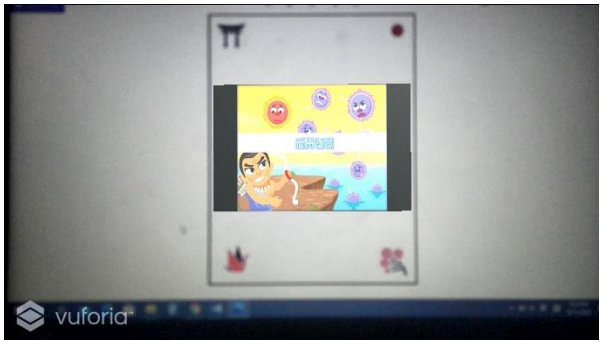

Figure 1. Implementation AR in Listening Material

The resulting development is AR Content Listening Digital Teaching Materials. Digital Teaching Materials Listening Contains AR in the form of a mobile application with a .apk extension. This teaching material was developed using AR technology which can be applied to an Android smartphone. This application development uses the ADDIE development model which has been described in the method. The results of the development of AR-loaded Listening digital teaching materials will be explained as follows:

Small Group

Table 1. The result of Testing in a small group

No	Assessment Aspect	Amount		V (%)	Criteria
		Tse	Tsh		
1	Display	216	240	90,0	very valid
2	Utilization	275	300	91,9	very valid
3	App Quality	310	360	86,1	very valid
4	Content Aspect	270	300	90,1	very valid
	∑ Tse	1071			
	∑ Tsh	1200			
	Mean (V)	89,3			very valid

The small group trial was carried out by 15 students who were taken in 2. The trial was carried out using the attached respondent test questionnaire. The data collected is in the form of quantitative data on physical aspects of appearance,

utilization aspects, technical quality of applications, and content aspects with a total of 20 questions.

Table 2. The result of Testing in a Large group

No	Assessment Aspect	Amount		V (%)	Criteria
		T_{se}	T_{sh}		
1	Display	508	560	90,7	very valid
2	Utilization	628	700	89,7	very valid
3	App Quality	695	840	82,7	valid
4	Content Aspect	623	700	89,0	very valid
	∑ T_{se}	**2454**			
	∑ T_{sh}	**2800**			
	Mean (V)	**87,6**			**very valid**

The large group trial was carried out by 30 students who were taken in 2. The trial was carried out using the attached respondent test questionnaire. The data collected is in the form of quantitative data on physical aspects of appearance, utilization aspects, technical quality of applications, and content aspects with a total of 20 questions.

CONCLUSION

This research built the application for teaching in listening that the material of learning using AR. The testing of teaching materials for listening used augmented reality was carried out in 2 stages, namely: a small group trial conducted by 15 students in Pendidikan Bahasa Mandarin at the Univesitas Negeri Malang that the result of testing was 89.3% for validation and accuracy; and testing in large group or field trials conducted by 35 students in that was 87.6% for validation and accuracy. It can be concluded that the materials of listening with Augmented Reality was suitable to be used as teaching materials and can be used in the learning process to grow learning activity reaching 86.3%.

SUGGESTION

Since this research was built on Augmented Reality application , the future researcher can use another medias to improve students' Chinese listening skill.

REFERENCES

Cunningsworth, A., & Tomlinson, B. (1984). Evaluating and selecting EFL teaching materials. Heinemann Educational.

Howard, J., & Major, J. (2004). Guidelines for designing effective English language teaching materials. The TESOLANZ Journal, 12(10), 50-58.

Irwansyah, F. S., Yusuf, Y. M., Farida, I., & Ramdhani, M. A. (2018). Augmented reality (AR) technology on the android operating system in chemistry learning. In IOP conference series: Materials science and engineering (Vol. 288, No. 1, p. 012068). IOP Publishing.

Golonka, E. M., Bowles, A. R., Frank, V. M., Richardson, D. L., & Freynik, S. (2014). Technologies for foreign language learning: A review of

technology types and their effectiveness. Computer assisted language learning, 27(1), 70-105.
Grigoryeva, E. V., Leyfa, I. I., Yatsevich, L. P., Demyanenko, M. A., Makovey, N. V., Pavlushkina, T. V., & Masalimova, A. R. (2015). Designing technology of English language teaching content based on international component. Rev. Eur. Stud., 7, 123.
Sunarti, S., Widyatmoko, T., Muyassaroh, L. U., Ardiyani, D. K., Hidayat, E., & Mintowati, M. (2020). New smart virtual content for Hanzi characters in Mandarin laboratories. Advances in Engineering Research, 196, 19-24.
Zhou, Y., Ding, L. Y., & Chen, L. J. (2013). Application of 4D visualization technology for safety management in metro construction. Automation in Construction, 34, 25-36.
Turco, R. R. D., Buomprisco, G., Pietro, C. D., Kenny, J., Masotti, R., & Pugliese, J. (2014). Edition visualization technology: A simple tool to visualize TEI-based digital editions. Journal of the Text Encoding Initiative, (8).
Wu, H. K., Lee, S. W. Y., Chang, H. Y., & Liang, J. C. (2013). Current status, opportunities and challenges of augmented reality in education. Computers & education, 62, 41-49.
Lee, K. (2012). Augmented reality in education and training. TechTrends, 56(2), 13-21.
Kesim, M., & Ozarslan, Y. (2012). Augmented reality in education: current technologies and the potential for education. Procedia-social and behavioral sciences, 47, 297-302.
Chen, P., Liu, X., Cheng, W., & Huang, R. (2017). A review of using Augmented Reality in Education from 2011 to 2016. Innovations in smart learning, 13-18.
Branch, R. M. (2009). Instructional design: The ADDIE approach (Vol. 722). Springer Science & Business Media.
Sunarti, ., Widyatmoko, T., Rizman, ., Bukhori, H. A., & Wahyono, I. D. (2021). Implementation of Chinese Folklore Virtual Content Using an Expert System. KnE Social Sciences, 5(6), 56-64.