ADDIE method for implementation of virtual reality in online course using model project-based learning

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ABSTRAK

Penelitian ini bertujuan untuk mengimplementasikan *Virtual Reality* (VR) dalam pembelajaran online untuk pembelajaran bahasa Mandarin. Model pembelajaran dalam penelitian ini adalah pembelajaran berbasis proyek untuk mendukung media dalam VR. Pengembangan VR dalam pembelajaran online menggunakan metode ADDIE karena penelitian ini mengembangkan sebuah media dan untuk menggunakannya, siswa memiliki model pembelajaran sebagai pembelajaran berbasis proyek. Sasaran penelitian ini adalah efektivitas penggunaan VR dalam pembelajaran online untuk meningkatkan kognisi siswa. Dalam penelitian ini, VR diujicobakan kepada 20 siswa untuk mendapatkan data kognitif siswa. Hasil dari penelitian ini, VR memiliki efektifitas sekitar 78% dibandingkan tanpa menggunakan VR. Dapat disimpulkan bahwa VR efektif digunakan dalam pembelajaran mandarin.
Kata Kunci: ADDIE; Virtual Reality; Project-Based Learning

ABSTRACT

This research aims to implement virtual reality (VR) in online learning for the Chinese language of learning. Model learning in this research is project-based learning to support media in VR. The development of VR in online learning used the ADDIE method because this research developed a media and for using it, students have model learning as project-based learning. The target of this research is the effectiveness of using VR in online learning to improve the cognition of students. In this research, VR was tested by 20 students to get data on students' cognition. The result of this research, VR had effective around 78% compared to without using VR. It can be concluded that VR is effectively used in learning mandarin.
Keywords: *ADDIE; Virtual Reality; Project-Based Learning*

INTRODUCTION

Chinese is a universal language of communication that underlies the development of modern technology, it has an important role in various disciplines,

and advances human thinking. To master and create technology in the future, mastery of Chinese is needed to equip students with the ability to think logically, analytically, systematically, critically, and creatively and work collaboratively (van Vliet et al., 2015). These competencies are needed so that students can have the ability to obtain, manage, and utilize information to survive in conditions that are always changing, uncertain, and competitive. The lack of interest in self-study by students at home, the lack of interest of students in reading textbooks, they prefer to fill their spare time at home watching television, play smartphones or gadgets, or just playing with friends rather than reading Chinese textbooks (Castro-Lopes et al., 2021; Yan et al., 2018). The development of the world of technology, especially gadgets, which is currently very fast, inevitably makes everyone inseparable from gadgets, including adults and children (Hari & Hermawan, 2015). Besides these problems, students at low-level universities also have difficulties in learning Chinese face to face, therefore effective communication media is needed to convey the understanding of Chinese (Hari et al., 2015). At the elementary school level, when children are at the stage of concrete operational thinking, the idea of effective communication to understand Chinese concepts is to use instructional media (Hari & Budi Hermawan, 2014).

There have been many studies on the use of VR media in learning Chinese. Media in the area of educational technology is a learning resource in the form of a combination of materials and equipment. Materials here are items that are usually called software or software in which messages are contained to be conveyed using equipment (Widyatmoko & Akhmad Bukhori, 2021). The word media comes from the word medium which means an intermediary or messenger from the sender to the recipient of the message (Agusrina, 2008). The development of learning media should also include aspects of character education so that students have strong character and morals, this is in line with stating learning tools that support character education (Sun & Liang, 2016). The use of learning media in the world of education aims to create fun learning. The development of learning media is an innovation to existing learning media, the development of learning media allows the creation of learning multimedia that is more interactive and effective in learning, one of which is the development of Virtual Reality media (Hero & Lindfors, 2019; Seechaliao, 2017).

However, Project-Based Learning (PBL) is an innovative approach to learning that teaches many of the strategies critical to success in the twenty-first century (Guo et al., 2020). Students encourage their learning through inquiry, as well as work together to research and create projects that reflect their knowledge (Pankhurst, 2012). By accumulating viable new technology skills, and becoming proficient communicators and advanced problem solvers, students benefit from this teaching approach (Mee et al., 2018).

This research aims to implement PBL. Instructional development was chosen because of its strong relationship with real-life and can deal with the main problems in project-based learning (Semela et al., 2013). It was found that project-based learning was the right choice. In addition, e-portfolio assessment has proven to be useful in project-based learning (Putri Iriani et al., 2019). The implementation of the PBL model on the task of making Chinese Virtual Reality is carried out with preparation based on this needs analysis research using this format for each section (Akhmad Bukhori & Widyatmoko, 2021; Sunarti et al., 2021).

METHOD

This research is a type of qualitative research with needs analysis oriented to product development. The resulted product is in the form of Chinese language learning media that contains aspects of entertainment and thematic learning on low-level University Chinese material. The analysis model used in this needs analysis uses the first stage (analysis) in the ADDIE development model, which is a development model consisting of five-stage which include analysis Analysis), design (Design), development (Development), implementation (Implementation), and evaluation (Evaluation) (Aldoobie, 2015; Saputra et al., 2020). The ADDIE development model was developed by Dick and Carry in 1996 to design learning systems (Akhmad Bukhori & Widyatmoko, 2021).

The purpose of the analysis phase is to identify the possible causes of the performance gap (Yin & Huat, 2021), the requirements analysis procedure in Project-Based Learning can be seen in the figure below. The data collection technique in this study was using a questionnaire. This questionnaire is used to determine the form of media, material, and discussion of Chinese and the flow that will be developed.

RESULT
Performance Gap Validation

This analysis was carried out using a questionnaire instrument for learning media needs with teachers and elementary school students as respondents. In the analysis with teacher respondents, there were 20 student respondents at the Malang State University with a summary of the results of the questionnaire can be seen in Table 1.

Table 1. Parameter of Quizzer in VR Media

No	Instrument	Result
1	The role and benefits of using learning media	(1) Facilitate understanding of the material presented (2) Facilitate the teaching and learning process (3) Make Chinese more interesting, (4) interactive, creative and fun (5) Learning becomes more active, effective and efficient
2	Forms of learning media that can motivate students	Audiovisual, computer, internet, concrete media, learning videos, animation, electronic media, games and integrated media
3	Utilization of technology to support the learning process	Very useful and helpful like watching math animation movies, making learning more active by adjusting educational goals
4	Application of Chinese learning media in VR	(1) Can make Chinese more fun (2) Make children more focused on the material discussed (3) Not monotonous, interesting and motivating students in learning (4) Generating students' curiosity in learning (5) Stimulate students to react both physically and emotionally if packaged clearly and completely (6) The learning process becomes more interactive, easy and fun

	(7) Accelerate students to think creatively, think towards concepts and daily applications

Identifying the characteristics of students

Analysis of the character of students is also carried out using a multiple-choice questionnaire. The respondents consisted of 30 low-grade university students in the Malang area, there were three groups of variables used, namely consisting of students' interest in learning Chinese, students' knowledge of Chinese, and preferred forms of learning media.

On the results of students' interest in learning Chinese, 73% of students think Chinese is fun, and 63% of students have studied alone at home, it's just that the intensity is rarely done. On the results of knowledge of the Chinese language, 63% learn certain material in Chinese is fun. As for the form of learning media that students like, it can be seen in the Figure 1.

Figure 1. Mandarin VR application view

Formulating instructional goals

The instructional objective of making VR was formulated by analyzing the Basic Chinese Workshop Semester Learning Plan and seeing the performance gaps carried out in the needs analysis 1, the instructional goal formulated was that students could make stop motion-based Chinese VR learning media properly, correctly, and interestingly and liked 80% of respondents. Therefore, students must present the products that have been made to panellists from students and lecturers (Xu, 2021).

Identifying the Resources Needed

This stage is the stage of inventorying the needs for hardware, software, and media materials that will be used to create a Stop Motion-based Virtual Reality Chinese Language VR (Fleischmann, 2021). There are four categories of resources needed, namely: hardware, software, learning materials, and consumables. The hardware used as a photographic medium is a photographic device on a smartphone, this will make it easier for students to make stop motion-based filmmaking projects, considering that almost all students already have smartphones.

The software used is the Stop Motion Studio application which can be downloaded from the Google Play Store on student smartphones. To combine and edit several pieces of Virtual Reality used the Windows Movie Maker tool. The subject matter and the determination of titles and themes use teaching materials in the thematic material of the based life of learning's curriculum at low-grade universities, while the themes and plots developed to follow the theme of the based life of learning's curriculum following those discussed in the Chinese language

discussion. Used is used to create characters, create backgrounds. The materials used are Styrofoam, coloured paper, backdrops, and other stationery.

Determining Learning Strategies

The learning strategy used is to use a student-centred PB learning strategy (Student Center Approach) to develop real-world skills in the field of educational technology, having the ability to work well together, being able to make wise decisions, taking initiative, and solving complex problems.

This student project is titled the development of Chinese language learning media by making VR. The time required for students to complete this Project Base Learning is four effective months (one semester) in the odd semester of the 2019/2020 academic year with a fairly high level of difficulty. Monitoring of students is carried out weekly for 2 effective credits. Students are explained and demonstrated how to make VR stop motion using smartphones with the software, students are also assigned to look for references for making VR on the internet.

The assessment criteria used are by looking at the product results of PBL and the assessment of cooperation between members of the student group (Cheng et al., 2017). The product results are assessed by looking at the suitability of the Chinese explanation in the VR film with the Chinese concept discussed, whether the film is interesting or not for low-grade University students, and the Chinese VR communication skills with students.

Develop Program/Project Management Plan

The preparation of the management plan is carried out by scheduling to ensure that the project can be completed properly using effective time. The program management plan goes through four stages, namely the preparatory stage which includes an introduction to making films using a stop motion studio and searching for literature on stop motion. The second stage is compiling teaching materials and making storyboards as a reference for making VR. The third stage is producing Chinese VR based on stop motion and the fourth stage is giving the final touch to the product, presenting project results, and evaluating the student.

DISCUSSION

The performance gap analysis shows (Table 1) that the interest and need of teachers for learning media are quite high, especially considering the current needs and technological advances (Dwi Wahyono et al., 2020). From the results of the performance gap questionnaire, it can be seen that the learning media that are of interest are audio-visual learning media that are interesting, interactive, and fun, but this media is rarely obtained in the community. Electronic media tend to provide entertainment shows and films which tend not to educate (Chen, 2020), it is necessary to use film media as learning media for students, in the use of Chinese.

VR also, if packaged properly, will stimulate students emotionally to enjoy more Chinese discussion in the packaging of life. daily. This is supported by the VR function that gives us an idea that VR is more than just making cartoons, but more than that VR can be used to convey information, messages, ideas, and even propaganda for various purposes and interests. A simple example is the use of VR as a teaching medium (Sunarti et al., 2020).
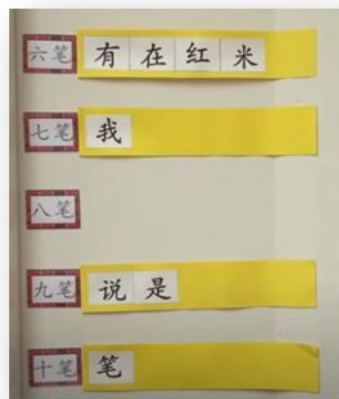
Figure 2. The character of the Chinese Language

At the stage of identifying the character of students from the data, it can be seen that actually, students at the university have a good interest in Chinese lessons, it's just that this abstract Chinese language needs to be delivered using appropriate learning methods and media so that the delivery of Chinese material is required to be by stages of student learning development (Figure 1). At the concrete operational stage, students can make conclusions from something in real situations or by using concrete objects and can consider two aspects of real situations together. The results of student interest in the form of media that students prefer tend to like learning media in the form of VR and multimedia.
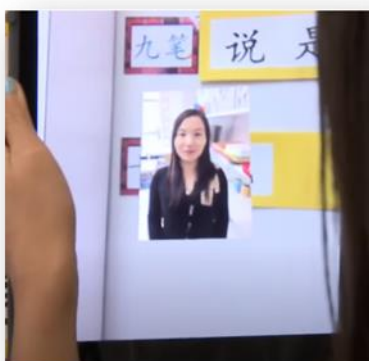

Figure 3. Implementation of VR in the Chinese language

At the stage of formulating instructional objectives, after analyzing the Learning Plan, the preparation of these instructional objectives uses the ABCD (Audience, Behaviour, Condition, and Degree) rules (Figure 3). It defines as follows: Audience is a student who will learn, behaviour is a specific behaviour that will be raised by students after completing the learning process in the lesson, conditions are conditions or limitations imposed on students or tools used by students when being tested (not at the time of learning), and degree is the level of success of students in achieving these behaviours. The formulation of instructional objectives also refers to the identification of student characters such as interests, character, and abilities of students as well as the extent to which the abilities and skills are possessed by students.

Difficulties that are found at this stage is to determine the ability of prerequisite what should be owned by the student before the project-based learning

since students of education Languages Chinese program study did not need specific study techniques – techniques of making VR like photographic techniques, lighting engineering, sound engineering and other things that support the project is completed (Wahyono et al., 2020).

Meanwhile, students are also in the process of making Chinese VR learning media assigned to create instructional objectives. Instructional objectives can be formulated using a performance gap analysis accompanied by a basic competencies analysis. The analysis of basic competence is actualized by using the theme of VR which is adjusted to the theme in the education curriculum, while the analysis of basic competence is carried out by analyzing and making a competency map.

In this step, the examples and trials carried out on learning to students are to analyze the basic competencies of Chinese VR in semester 4 of the listening material course. The preparation of these competencies was made to formulate instructional purposes, namely learners semester students 4 with VR able to understand and solve problems Chinese discussion of subjects listened correctly 80% In making the plot, students are assigned to make a plot according to the theme of the curriculum thematic material, while the Chinese language learning flow is adjusted to the competency map assigned to the student as shown in Figure 2. To maintain the flow and learning materials, a storyboard format is made as an assignment. To students with content components, namely scheme, visuals, duration, characters, audio/dialogue, property, and location settings. The assignment stage by making a storyboard is very important to build a framework and stages of teaching Chinese and is a planning stage in making VR so that when the manufacturing process does not go out of the flow and teaching of the competency map that is built.

To support PBL assignments, it is necessary to create characters who play a role in Chinese VR. The characters and characters created are figures that have shapes and names by the concept of shapes in Chinese, the goal is for students to get to know and be closer to Chinese shapes which consist of Chinese characters.

CONCLUSION

From the results of the analysis, it was found that the Chinese language filmmaking project for the university was very feasible to be made as a project assignment on the PBL assigned to students. To support the implementation of PBL, it is necessary to prepare and identify the needs that will be used such as studio tables, tripods, software, and consumables, as well as the design of the Project-Based Learning activities. The selection of PBL by making VR in Chinese has enormous benefits for students so that students are not only equipped to become teaching staff but are also equipped to be able to see economic opportunities in other fields such as the creative industry.

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