The Development of Virtual Museum with Unity 3D of Learning History

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Abstract: The article discusses the development of virtual museum for learning history in Sriwijaya University by applying Unity3D. Development of the research uses Borg & Gall Model and Roblyer &Doering. This research conducted at Sriwijaya University with 45 respondents students and 5 reviewers. Research steps consist of three broad outlines. Firstly, analysing of virtual museum use. Secondly, development procedures from expert validation to virtual museum development steps and experiment test. Thirdly, media evaluation, revision result based on experiment test and validation of virtual museum expert. Based on the development part of the research, it can be concluded that theoretically feasibility test to the several experts and empirically proper test on field by learners, small group, and filed test are gotten development product of virtual museum for hybrid learning in Sriwijaya University and able to contribute an indirect experience to the students and learning process effectively.

1 INTRODUCTION

Today the development of the world of information and communication technology has penetrated all aspects of life (Mustakerov & Borissova, 2017) is no exception in the world of education both in developed countries or already developing(Tanye, 2017; Odeh, Shanab & Anabtawi, 2015) in many subject human life in virtual context (Chang, Zhang, & Jin, 2016; Li, 2016). The digital age also affects media or learning material in digital form, precisely in the development of virtual museums in public areas throughout the world (Pan, Cheok, Yang, Zhu, & Shi, 2006; Guo, Zhu, & Yan, 2016; Ye, 2016; Bai & Lavin, 2014) with purpose and content that is clearly different. Well-designed virtual field trips, which involve maps, images and video clips in various formats can help students visualize experiences on the site created(Jacobson, Militello, & Baveye, 2009). Virtual field trips can be designed for learning at historical sites, such as museums, temples, monuments, and more(Bai & Lavin, 2014). Virtual field trips conducted in museums are commonly defined virtual museums.

The virtual museum is also useful to participate in preserving the culture, but it is also more innovative as well practical. We do not need to come to the far museum to only see one relic, but only by using a virtual museum then we can save costs both in terms of methods and tools, and certainly more exciting in terms of its application (Styliani, Fotis, Kostas, & Petros, 2009; Feng, 2016). In order for future virtual museum users to gain indirect experience, it is expected that the learning process of history will be. The virtual museum application allows students to get to know the historical events through the museum's paintings, videos and dioramas. without having to visit the museum physically. This saves time and money (Barbieri, Bruno, & Muzzupappa, 2017). Learning by using a virtual museum application is chosen based on the learning strategies that are appropriate for the material presented. Learning strategies using this application can be used when face to face or online regardless of all existing restrictions.

Therefore, researchers are trying to develop a virtual museum by using Unity 3D applications, the introduction of historical sites is one of the subjects of education that tend to be difficult to attract students. 3D interactive map created using software Unity 3D Engine. In addition to the effective use of Unity 3D is also relatively affordable and suitable for

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beginners who want to develop game-based software (Jerald et al., 2014; Lu, Xue, & Chen, 2011). So the purpose of this virtual development is to give the impression of experience indirectly to its users, and the target is the students and also students in the process of learning history.

2 RESEARCH METHOD

The applied research approach or model is research and development. Research-development model of Borg & Gall, Roblyer & Doering,(M. D. Gall,Walter R. Borg, 2007) used as Virtual Museum based-Learning Hybrid Source Development research. In a broad line, it consists of three stages (Pratama & Sariyatun, 2017), first is an analysis of virtual museum use, second is development procedure from expert validation to virtual museum development steps and experiment test, and third is media evaluation revision result based on experiment test and validation of virtual museum expert.

Research subject consists of 45 students and two lectures of learning History in Sriwijaya University and also the stakeholder. Meanwhile, research instrument is validated by a language expert, a content expert, an educational technology expert, a multimedia expert, and a printed media expert. Data collection technique based on students' questionnaire and displayed descriptively.

3 RESULT AND DISCUSSION

Researchers conducted some reviews of some virtual reality found online. The Virtual Museum of Iraq State is accessed on the web address www.virtualmuseumiraq.cnr.it by using adobe flash devices in its development process. The shortcomings found in this device is an application that is not up to date with the development of 3D technology, the other shortcomings that, static appearance which causes the user cannot move space. For museums in the country, 3D museum objects can be found on the website address www.virtualindonesia.com which is a picture of the National Museum (Museum Gajah in Jakarta) in the development process using Photo 360 Degrees with real display. The weakness found in the virtual museum is a static view like Google Street View which is just a 360-degree photo display that limits the user's space in observing objects. Several factors are obstacles found in the virtual display of Indonesian museums. In addition, researchers also conducted several reviews on some article about development of e-learning and virtual museum development related to the concept of development that will be developed(Rojas-Sola, Castro-García, & Carranza-Cañadas, 2011; Moffat & Robinson, 2015; Ann Nicholls, n.d.; González-Marcos, Alba-Elías, Navaridas-Nalda, & Ordieres-Meré, 2016; Lou, 2017). Based on the findings, the researchers tried to develop a virtual museum dynamic and also well in appearance compared to previous findings.

Besides, the analysis also done to the students and lecturers of Indralaya University's learning history as well as the stakeholders regarding their responses on the use of e-leaning media in the process of learning history, based on the interview results obtained some outlines of their responses among others:

a. Students usually rely on internet at the learning process only services such as Youtube and so forth.
b. The use of multimedia technology in the learning process of history is very good because it can petrify understand the material well, but there should be innovations, actions that can be done update or variation in learning with technology utilization.
c. Procedures used in designing learning materials, many have used the technology, but there is also a normal course that only a visual media, Although the development of the Internet is growing rapidly there are still many teachers who do not know about the use of technology in learning so that still using media pickup.

3.1 Virtual Museum

Furthermore, virtual museum can create a conceptual framework. Jan Jonker and Bartjan W. Penink expressed about the definition of conceptual model in their book, that "a conceptual model of concepts, theoretical constructs and relations between those attributes and concepts based on theoretical constructs"(Jan Jonker, 2010). Furthermore, they also explain that "Conceptual models are inescapably based on theory or at least theoretical notions. Without this theoretical input, it is impossible to make a dedicated construction of a specific reality up front".

The development of the procedural model as the researcher in this research adopted from four development models. The four development models in question are the development model 1) Borg and Gall 4th Edition, 2)Unity 3D is very popular in recent years, as it is perfect for developing small and independent game apps (Xie, 2012).

The result of physical development in the form of final draft has done theoretical and empirical feasibility test. Theoretical tests are conducted by several experts or ratters through interviews consisting of Instructional Design Experts, Content / Material Experts and Language Experts. Generally, there are several things that must be improved based on the advice of the experts, namely improvements in terms of grammar and also the depth of material or content of this VM, in terms of appearance and also the concept of motion is good enough so worthy to be tested.

3.2 Testing and Evaluation Virtual Reality

The objective of this development is to provide facilities to students of history education in the learning process, in this VM content contains about the history of Indonesia National. Researchers assume that by using a virtual museum as a learning material then its users will get a real experience or indirect experience without having to visit the actual museum. After conducting preliminary flowchart pre-production hence, the researcher conducted the validation to some experts about virtual museum richness tested. In broad outlines, there are some input from the experts in validating the content, materials and also the appearance of this virtual museum namely;

a. The writing or typing is clear, and the u.se of the standard term is correct but they are best to make changes to the altering word that should change and the word chronology is changed by word chronology and preferably text related to typography
b. Checking is required by using devices that will use the computer hardware, tablet and android aspects of compatibility, the compatibility between products produced with Operation System or OS, the suitability between images, video, and sound with learning objectives so as to communicate the material well.
c. Adding the intro to the submitted material, The text on the quiz should not be too long, The logo and the background are not contrasting should the small logo be omitted, Shadow in the shadow is not too appropriate, not gray note the color of example elements at the Museum of Bank Indonesia, Material properties (shader) produced not yet fit the example on the top of the monas color match the existing material and use narrators with special recording and Adjust the color of the original object and material.

Based on input from the experts, the researcher made some improvements in accordance with the suggestions that have been given, so that later it will minimize the occurrence of errors and also mismatch either the material or the application of virtual museum at the trial time.

Figure 1: Simple front view of the house with traditional style as the home of the entire Museum

Figure 2: Sections inside the home containing furniture and photo documentation relating to the Indonesian nation history

After the improvement, the researchers conducted empirical feasibility test, small group test (small group) which totally 12 students and field test (field test) amounted to 30 students. The three stages of the experiment are conducted to the students of History Educations Program of FKIP in Sriwijaya University with samples of each different stage. The following are the results of the empirical feasibility study descriptions in the field.

The indicator of learning materials that exist in the learning materials obtained the attitude expressed in small group test with a category or classification is very good and on test field good classification test. The statements for the learning material indicator obtained very good classification on small group trials and either in the test field. Learning activity has been very good according to respondents on small group test and have good according to field test

respondents. Similarly, for evaluation indicators of learning outcomes (test) that developed according to small group respondents and field tests are good. Relying on the attitude of respondents that have been described above, the result of development of learning materials based on virtual hybrid learning museum that has been developed this get good response. This means that attitudes toward material satisfaction developed are aligned, proportional and support the results of pre-test and post test in small group and field test stages. Thus the researchers concluded that the questionnaire of respondents' attitudes toward the results of learning materials based on virtual hybrid learning museum has strengthened the effectiveness test results. This adds to the evidence that the products produced in this study are appropriate.

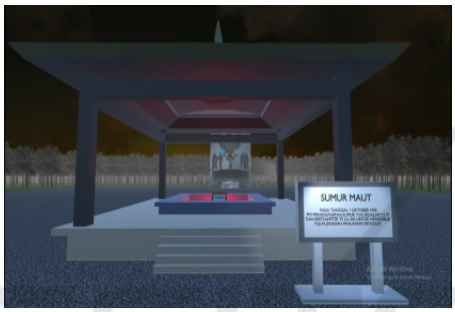

Figure 3 : The view from the back of the room where the Asian-African Conference was held

Figure 4 :The view from the back of the room where the Asian-African Conference was completed with 3D furnishings

At the implementation time, there are several problems with the virtual application of this museum, including;

a. Virtual application of the museum can not be opened online on the website because it requires great and expensive hosting. The researcher uses a desktop application by inserting an offline application on the computer used. The app can also be used on Android using the PlayStore app. This application is used using special 3D glasses.
b. Internet network problems, students often do not conduct online activities due to not having a quota or wifi is not up.
c. Inadequate Computer Specifications.

The use of virtualmuseumindonesia.com website, makes it easy for students to learn anywhere and anytime during online learning. Students can access various facilities provided, namely chat room, power point, discussion room, and blog reflection. The use of virtual museum applications enables students to understand a historical event through painting, video, dioramas, and pyrotechnics in a museum without having to visit the museum physically. This will save you time and money. Learning using virtual museum applications is chosen based on a suitable learning strategy for the material being delivered. Learning strategy using this application can be used at the time of face to face or even online. Use of print materials with the content of the material in depth and equipped with glossary, summaries, exercises, and a list of libraries make students able to understand the material clearly. The guidebook of lecturers and students provides guidance on the use of teaching materials based on virtual hybrid learning museum. This handbook comes with online usage instructions, virtual museum codes, learning strategies, contractual lectures, and more.

Virtual museum, in addition to facilitating the learning process on historical material is also able to assist students in generating cultural awareness, therefore in addition to effect on cognitive shutter use of virtual museum also affects affective shutter, and assist students in overcoming the pattern of memory short-term memory at the poses of learning because it maximizes the visual concept (Brady et al., 2008; Klein & Meltzoff, 1999) historical reconstruction as well as awareness to help preserve the culture around us (Mortara et al., 2015).

Figure 5 and 6: Students use 3DVirtual goggles to access the virtual museum.

4 CONCLUSIONS

Through the theoretical of feasibility test to some experts and empirical feasibility test in the field with the stages of learners, small groups, and field test produced are gotten the development of learning materials based on virtual hybrid learning museum in the course of Indonesia National History VI ofHistory Education Sriwijaya University and able to provide an indirect experience to students. Preferably the implementation of learning Hybrid learning is not implemented more than equal to 20%. Lessons learned still require face-to-face process in the classroom with a larger percentage. Gadgets ownedby the students personally do not support as a medium for the virtual learning of the museum, therefore this learning can be overcome by doing in computer laboratories that have high specification capabilities

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