Multimedia Based on Virtual Reality in Indonesian for Foreign Speakers Learning

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Abstract. Virtual Reality technology can manifest 3D virtual environments that are computer-simulated, and allows for the emergence of various interactions in 360° space. Virtual Reality is a technology that allows users to interact with an environment simulated by a computer. This study aims to create multimedia in the form of videos and photos based on Virtual Reality in the context of learning Indonesian for Foreign Speakers (BIPA). This research is based on Research and Development (R & D). The steps taken in this research process were: (1) research and data collection, (2) planning, (3) product development, (4) initial field trials, (5) revision of trial results, (6) product improvement and (7) final field implementation test. Based on the validation of experts, both Indonesian linguists and media experts, this Virtual Reality multimedia is feasible to be used as BIPA learning media. In addition, based on limited test results, this Virtual Reality multimedia fulfills three variables, namely: functionality, efficiency, and usability.

1. Introduction

Technology products, such as computers, have revolutionized the world of education. Computers are able to present a multisensory learning experience so that if used properly, this product can increase the level of learning in a shorter time compared to learn using conventional methods. In fact, at this time it can be said that information technology-based learning has become one of the important needs in the world of education. Technology products that are currently popular, one of which is virtual reality (VR) technology. VR technology can manifest three-dimensional virtual environments that are computer-simulated, and allows for the emergence of various interactions in 360° space. In addition, VR can simulate something that is difficult to present directly in the real world. Therefore, this technology is widely implemented in various industrial sectors, such as: entertainment, education, military, architecture, and medicine.

According to Zaino, based on a survey conducted by GfK through KnowledgePanel on 1,011 K-12 teachers in the United States in May-June 2016, showed that 85% of teachers agreed that VR would have a positive effect on their students, 84% of teachers answered VR could increase student motivation, then 83% of teachers stated VR might help improve learning outcomes. Meanwhile, 77% of teachers help students better to understand the concept of learning. However, only 2% of teachers use VR content in their classrooms [1].

Based on the survey, it can be shown that VR has a positive impact on learning, one of which helps students better to understand the concept. Problems in understanding concepts are often encountered in second language learning, for example, when second language learners try to collocate word
unusually. Said stated that the irregularity is a negative transfer of the learner's mother tongue or in a language error analysis called inter lingual error [2].

Utilization of virtual reality technology in the Education field has become known in the early 1990s [4] [5]. VR technology is used by educators by utilizing the immersive power of VR technology that encourages participants to engage in learning activities. Technology in VR has intrinsic properties and is able to activate cognitive tools that can direct students to describe the ideas they think at once involved in meaningful learning. The environment presented in VR can help students to understand and creatively imagine things or environments that are not in front of them. It is this visualization capability that makes this VR technology appropriate for conveying abstract concepts. VR technology is able to present a more real environment. This can help reduce cognitive burden and imagination, making it easier for students to conceptualize [6]. A meta-analysis study also shows that virtual reality-based instruction was quite effective [5].

Until now, research on VR in language learning, especially foreign language or second language learning has been done, including: “The “third place” – virtual reality applications for second language learning” [7], “Integrating video-capture virtual reality technology into a physically interactive learning environment for English learning” [8], and “Sustained inhibition of the native language in bilingual language production: A virtual reality approach” [9]. In addition, there are conceptual research, “Virtual Reality: sebuah terobosan pemanfaatan media dalam pembelajaran BIPA” [10]. All of these studies have described VR applications and approaches in second language learning. However, until now, research that specifically addresses the implementation of VR in Indonesian learning for foreign speakers in the aspect of language skills has never been done. In fact, the aspect of language skills for foreign speakers is an important aspect in communicating and interacting with native speakers, especially in expressing the thoughts and feelings.

Based on this background, a study entitled "Multimedia Based on Virtual Reality on Indonesian Learning for Foreign Speakers" needs to be researched. It is expected that with this research, Indonesian for Foreign Speaker or Bahasa Indonesia untuk Penutur Asing (BIPA) learners can more easily understand concepts and minimize the negative transfer of their mother tongue when learning Indonesian. The priority issues in this study, namely the need for an Android-based Virtual Reality software on learning to speak Indonesian for foreign speakers.

The latest virtual reality environments generally present visual experiences, which are displayed on a computer screen or through a stereoscopic viewer, and some simulations have included additional sensory information, such as sound through speakers or headphones [11]. Virtual reality is effecting the way that spaces are built [12]. Virtual Reality allows users to enter the virtual space programmed by the machine/computer to create sensory experiences, especially vision and hearing. These two senses are stimulated to feel the experience as if the user really feels the same as the reality.

2. Methodology
This research is based on Research and Development (R & D). The steps taken in this research process refer to [13]. The steps taken were: (1) research and data collection, (2) planning, (3) product development, (4) initial field trials, (5) revision of trial results, (6) product improvement and (7) final field implementation test. Data sources of this study include: (1) samples of BIPA teaching lecturers within the Department of Indonesian Language and Literature Education and (2) samples of BIPA students within the Department of Indonesian Language and Literature Education. The instruments that will be used in this research are assessment instruments (expert scales) at the formative stage, assessment instruments (expert scales) at the summative stage, and instruments for students' perception of the implementation of VR-based multimedia questionnaires.
3. Result and Discussion
Multimedia-based virtual reality in Indonesian for Foreign Speakers (BIPA) developed in this study is a multimedia-based photo and video 360°. Multimedia VR can be run using VR Photo and Video Player, both on Android and IOS devices. This media is used as an audiovisual tool to improve language skills, especially related to recognizing and describing the environment. Multimedia and photo-based video 360° VR was developed with the aim of helping BIPA learners improve their language skills through media that is multisensory and interactive. Even they can easily use this media with mobile phone devices and VR Glasses (VR Cardboard) anywhere and anytime. The following will describe the development and results of field trials that have been carried out according to the stages in the research method.

3.1. Multimedia Development Based on Virtual Reality in BIPA learning
Multimedia Virtual Reality in the form of video and photo 360° is a medium that can be used through VR applications on Android and IOS with the help of VR Glasses (VR Cardboard). This multimedia can be run on Android and IOS mobile phones with a minimum of 1 GB of memory, has a gyroscope and accelerometer features. The development of this media can be pursued through several steps, including the steps of media design, material collection, and program development. This media is created with the help of Camera 360°, such as: Samsung Gear Camera, Ricoh Theta, Xiaomi 360°. However, this research uses Samsung Gear Camera v2.0. This camera is used to capture images around at once. Besides being able to, taking pictures in the form of photos, this camera is able to take video and video looping. After RAW media is obtained, RAW media must go through the editing stage. For photo editing and adding help subtitles, Adobe Photoshop is used. Meanwhile, for editing, rendering, and adding subtitles for help, it was used by Filmora Wondershare.

To run the media on mobile devices, mobile phones need to be installed with the VR Player application, such as KMPlayer VR, Var's VR Player, and VR Photo Player or run on the Cardboard application. Then the cellphone is placed in the VR Glasses device. To monitor visuals produced on mobile phones, BIPA instructors can install mobile mirroring applications on laptop devices, such as the SideSync application. Then use presentation mode to display multimedia on both devices.

3.2. User Perception of Multimedia Based on Virtual Reality in BIPA learning
After the media, development is complete, the next step is to carry out expert tests and limited tests. The following is the results of the expert test and a limited test of multimedia-based virtual reality in learning to speak BIPA.
3.2.1. Expert Validation
At this stage, Multimedia Virtual Reality in BIPA learning is validated by experts. Experts who carry out validation are experts in Indonesian Language Education for Foreign Speakers and Indonesian Language Learning Media experts for Foreign Speakers.

3.2.1.1. Results of Expert Validation by Indonesian Language Education Experts
**Indicator 1.** In the first indicator, namely Multimedia Virtual Reality in BIPA learning BIPA can help students learn to improve language skills to recognize and introduce the environment.

**Indicator 2.** In the second indicator, namely Multimedia Virtual Reality in BIPA learning is easy to use by BIPA learners in accordance with learning objectives, namely students are able to speak to recognize and introduce the environment in Indonesian.

**Indicator 3.** In the third indicator, namely Multimedia Virtual Reality in Learning to Speak BIPA according to BIPA learners shows conformity.

**Indicator 4.** In the fourth indicator, namely Multimedia Virtual Reality in BIPA learning, BIPA is easy to use, shows compatibility because in its use, it is very easy to use.

| Table 1. Language Expert Test Results |
|--------------------------------------|
| **Appropriate** | **Inappropriate** |
| Indicator 1    | 100%              | 0%                |
| Indicator 2    | 100%              | 0%                |
| Indicator 3    | 100%              | 0%                |
| Indicator 4    | 100%              | 0%                |

Based on the explanation, it can be seen that from the aspect of learning Indonesian for Foreign Speakers (BIPA), VR multimedia is feasible and can be used as a medium for learning language skills.

3.2.1.2. Results of Expert Validation by Learning Media Experts
**Indicator 1.** In the first indicator, namely the introduction of letters from Multimedia Virtual Reality in Learning BIPA shows the compatibility between pictures or videos, guide sounds, and help subtitles. This can be seen from the use of guiding sounds and help subtitles that are easily understood as a tool to expand vocabulary.

**Indicator 2.** In the second indicator, namely word recognition from Multimedia Virtual Reality in BIPA learning BIPA shows conformity. This can be seen from the accuracy of the image or video displayed with the voice of the guide, and the help subtitles.

**Indicator 3.** In the third indicator, namely the picture or video, the voice of the guide, and the subtitles of Multimedia Virtual Reality, this shows the compatibility between the picture, sound and help subtitles. This can be seen from the word that appears when a video or image is displayed with help subtitles, as well as a guided voice with help subtitles.

**Indicator 4.** In the fourth indicator, namely images and videos and guide sounds displayed in the Multimedia Virtual Reality are in accordance with the context of everyday life. Thus, the multimedia used is easy to understand.
Table 2. Media Expert Test Results

| Indicator | Appropriate | Inappropriate |
|-----------|-------------|---------------|
| Indicator 1 | 100%        | 0%            |
| Indicator 2 | 100%        | 0%            |
| Indicator 3 | 100%        | 0%            |
| Indicator 4 | 100%        | 0%            |

Based on the explanation, it can be seen that from the aspect of BIPA learning media, VR multimedia is feasible and can be used as a medium for BIPA learning. Based on the results of the validation test from the two experts, it can be concluded that multimedia Virtual Reality is feasible and can be used as a medium in learning BIPA. After expert validation, the next step is to do a limited VR multimedia test on BIPA learners in the UPI environment.

3.2.2. Limited Test Results for BIPA Learners

A limited test of VR multimedia was conducted on five BIPA learners within the Indonesian Department of Language and Literature Education. Limited testing is done using three variables, namely: (1) functionality variable, (2) efficiency variable, and (3) usability variable. Functionality Variables, assessed if this application can display images clearly, can produce sound clearly at each session, and the menu button can function properly. Variable efficiency, judged based on the process of displaying images in each session requires a short time; the sound process in each session requires a short time, the duration of the response at each session in a satisfactory application. Usability Variables, assessed if this application can: help users enrich vocabulary, can be used in BIPA learning, can introduce the use of Indonesian every day in various contexts, can learn to use this application easily, comfortable when used, easy to use, and made learning media to BIPA.

Table 3. Limited Test Results for BIPA Learners

|          | Able | Not Able | Neutral |
|----------|------|----------|---------|
| Functionality | 95%  | 5%       | 0%      |
| Efficiency | 100% | 0%       | 0%      |
| Usability  | 92,5%| 7,5%     | 0%      |

Based on the diagram, it appears that the use of the Multimedia Virtual Reality application shows a good level of use to be used for BIPA learners, how to operate applications and install Multimedia Virtual Reality devices is relatively easy. This can be seen from the total number reaching 95% of respondents said Can/Good, starting from the operation of the application, installation of devices, and images that appear on the screen of the phone with high response results. Meanwhile, the efficient use of the Multimedia Virtual Reality application gets a good response from BIPA learners to reach 100%, which states Can/Good, starting from 360° videos and photo spheres, help subtitles, and guide voices. Then, based on the aspect of usage, the test results show the figure of 92.5% states Can/Good and the rest state Not/Not Good as much as 7.5%. Based on the limited test results, it can be concluded that multimedia Virtual Reality can be used for BIPA.

4. Conclusion

The VR technology developed in this study is intended as a learning medium for Indonesian for Foreign Speakers. The media developed by using multisensory 360 photos and videos is expected to help students improve Indonesian language skills more effectively. The results of testing this learning media to media experts, BIPA learning experts, and BIPA students indicate that in general it can be concluded that this media can already be used or implemented in BIPA learning. There are several
things that need to be considered before using this VR media in BIPA learning. First, users must have the knowledge and ability to use VR Devices properly. Second, the teacher needs to determine in advance the learning objectives to be achieved. Third, the teacher needs to adjust the use of VR media to the needs of students. This is because every BIPA student has diverse and different needs. Therefore, this VR media needs to be continuously developed and evaluated based on user inputs in order to improve the effectiveness of learning.

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