

## Virtual Reality adoption in Indonesia higher Education from lecturer's voice

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### ABSTRACT

Indonesia's development of information and communication technology has overgrown. This can be seen by users of smartphones, a variety of Indonesian blogs, facebook or other social media and internet users. Virtual Reality is one of the information and communication technologies which started to develop in Indonesia. For this study the exploratory design approach was used to investigate the perceptions of lecturers regarding the teaching and learning adoption of VR with some indicators the benefits, ease of use, Challenges to the Adoption and skill of VR, that VR has the potential to enrich with interactive simulations and stunning visuals that immerse students in authentic learning experiences also it can push the boundaries of the traditional classroom to be engaging, creative, and responsive to the needs of the student.

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### 1. INTRODUCTION

Indonesia's development of information and communication technology has overgrown. This can be seen by users of smartphones, a variety of Indonesian blogs, facebook or other social media and internet users. Virtual Reality is one of the information and communication technologies which started to develop in Indonesia. Virtual Reality (VR) provides a 3D graphical environment that can be accessed via the website. The world of virtual reality is a three-dimensional world that helps users to manipulate and navigate tridimensional worlds (Collins et al., 1997). This technology is still not well advanced in Indonesia. Higher education in Indonesia uses almost nothing of Virtual Reality technology particularly English in the learning process. The lack of communication between teachers, educators, and learners has become a concern as higher education programs shift gradually to an electronic environment. Because online classes are usually taken in the home or workplace of a student, away from fellow students in the course, it is possible for them to feel alone and distant from their peers, professor, and even from the substance of the course. Students are more inspired to learn because they know they are a member of a learning group (Hartley et al., 2015).

Apprentices must therefore be able to consciously build and use the information they gain to communicate with it and preserve awareness. It has historically been achieved in predominantly online courses by discussion forums, which encourage students to exchange ideas asynchronously. Assignments which involve teamwork were also used to promote a sense of disconnection and belonging. Three-dimensional (3D) virtual worlds have, however, been explored over the past decade as the online faculty within several educational institutions felt the need to improve the learning experience and make online courses more interactive and offer more realistic learning opportunities (Karaman & K. Ozen, 2016)

The immersive world of the VR is encountered by devices and equipment such as computers, head-mounted displays, headphones, and motion sensing gloves, according to (Muijs et al., 2005). VR draws on the strengths of visual representations and provides an alternative method of presenting course-related

content that might improve teaching and learning. VR caters for students learning differently and hence, enhances teaching and learning (Pantelidis, 2010).

This research aims to tackle, to a limited degree, the research void raised by the scanty literature on adoption of Virtual Reality in higher education in Indonesia. It aims specifically to determine the perceived usefulness and ease of use of VR and the challenges to its adoption from the perspective of the lecturers. VR technology has evolved tremendously since the 1990s. It has become a new hype in the current modern society. There are two kinds of VR technology: immersive virtual environment and non-immersive virtual environment. Immersive VR is the perception of being physically present in a computer-simulated environment. The notion of virtual reality makes the users stop to think that they are interacting with computers but instead with the 3D environment (Robertson et al., 1993) The users are drawn into the 3D world and can directly manipulate and navigate the environment. The line between reality and the digital world can become blurred because of this immersive technology. The brains are tricked into thinking that they are in reality, but it is the opposite. Kozhevnikov and Gurlitt describe the immersive virtual environment as human-computer interaction in a computer simulation of 3D space. They further explained that the difference between the 3D immersive environment from non-immersive 2D and 3D environments is the way the users navigate the virtual environment. Immersive environment involves egocentric navigation, where the environment bounds the user; meanwhile, exocentric navigation, where the learner is outside the environment, or the user is looking at the environment in a computer monitor. Non-immersive VR does not require users to be physically engrossed in the environment, but they are provided with physical computer, keyboard, and mouse to navigate in the 3D virtual environment. In short, the element that differentiates the experience between immersive and non-immersive is the existence of computer-simulated 3D space.

Reasons to use virtual reality can parallel all the reasons one would use a two dimensional, computer-assisted instruction simulation (Pantelidis). At every level of education, virtual reality has the potential to make a difference, to lead learners to discoveries, to motivate and encourage and excite. The learner can participate in the learning environment with a sense of presence, of being part of the environment. VR technology benefits various industries; from science and technology to arts and history. In this paper, we will focus more on the education field. In an educational setting, VR can help students to comprehend concept, idea or phenomena that are hard to explain in conventional instruction. Javidi stated that the use of VR lets students visualize abstract concepts especially in science subjects and visit places that they have never been to. The students can also retain and process new knowledge efficiently since VR technology can promote active knowledge construction and critical thinking skills. She added, if the students were given a suitable environment and device, VR could be an effective means to develop sensory motor skills. This is also supported by (Yahaya, 2007). She suggested that VR can change the way students learn in university from conceptual learning to experiential learning.

Another research by Lan et al., they investigated the potential effects of foreign language learning using VR wearables and 3D avatar on elementary school students. In the study, the students were divided into three different groups; one group that used Kinect, one group used Second Life and one group that used a traditional textbook method. From the findings, students preferred 3D avatar-based language learning rather than Kinect or textbook. The students also showed greater performance in the post-test when using Second Life, followed by Kinect. Students who used the textbook did not make any significant improvement throughout the experiment. Although the students did not prefer the immersive experience when study language, Second Life is an example of VR learning that is non-immersive.

Mantovani discusses these potential benefits of the use of VR in education and training: visualization and reification, an alternate method for presentation of material; learning in contexts impossible or difficult to experience in real life; motivation enhancement; collaboration fostering; adaptability, offering the possibility for learning to be tailored to learner's characteristics and needs; and evaluation and assessment, offering great potential as a tool for evaluation because of easy monitoring and recording of sessions in a virtual environment.

## 2. RESEARCH METHOD

For this research the exploratory design approach was used to investigate the perceptions of lecturers regarding the teaching and learning adoption of VR. It has also used the purposeful sampling technique. Data were obtained from a sample of 19 lecturers at private university in East Kalimantan, Indonesia, from two English Departments. A qualitative approach has been used to gain a thorough understanding of the perceptions of the lecturers regarding the adoption of VR as a teaching and learning platform at university. The goal was to carry out semi-structured interviews with those 19 lecturers. Interviews were performed in English, and voice registered with permission from the participants. The recorded interviews were transcribed using Microsoft Word software. The transcribed texts were then analyzed using the data analysis tool 'Nvivo.' To this end, each transcribed text was loaded onto Nvivo and then analyzed by

grouping the responses of each participant into three categories: perceived usefulness, perceived user-friendliness and perceived barriers to teaching and learning adoption of Virtual Reality.

### 3. RESULTS AND ANALYSIS

The research uses benefits of VR for Teaching and Learning, ease of use of VR, challenges to the adoption of VR, also VR skill for analyze how is the participant perception when they use it for teaching and learning.

#### 3.1. Benefits of VR for Teaching and Learning

The advantages of implementing VR for teaching and learning were also reported by the majority of participants. Participant 18, for example, stated: "In the classroom, by creating an active environment to facilitate participation, VR would assist with teaching and learning." Similarly, Pantelidis stated that VR promotes active learning and creates an engaging environment to facilitate learning.

Participants 12 and 4 described the following advantages of adopting VR: "Translation of languages can be integrated into the program of virtual reality and there would be no language barrier that will hinder students from achieving their educational goals. VR visualizations can be experienced in any language and make learning flexible because students can learn at their own pace and thus promote effective learning".

Pantelidis has noted similarly that VR overcomes language barriers. For example, VR environments with chat rooms and forums give students from different cultural backgrounds equal opportunities to communicate.

Yahaya supports this, too. She suggested that VR can transform the way students learn from conceptual learning to experiential learning in university. Instead of listening to lectures and activities limited to the laboratory or school, the students are introduced to a virtual version of reality that may not be present in the regular classroom or be feasible. VR technology can also be manipulated to suit the students' learning needs. As a result, the learning becomes more engaging, meaningful and long-lasting.

Participant 11 claimed: "The use of VR in the classroom must allow for various types of learning. Some students may prefer visually to learn; then they can gain more by using VR to learn. Participant 19 reported that it is extremely powerful to use VR to practice and refine skills without fear of failure and can help students gain trust in new areas of learning".

Similarly, Pantelidis claimed that the visual and interactive strengths of VR make it suitable for various learning styles. Another participant stated that VR would be useful in modules like history by allowing students to virtually travel to destinations around the world. This assists in creating interest and motivating to learn the course content. Participant 8 further expanded with an example on the benefit of using VR to facilitate a learning atmosphere: Students obtain better outcomes in a supportive learning environment when they are able to communicate with peers.

In addition, interactive VR environments improve learning retention by encouraging module interest, as students retain more knowledge if they find a module or subject interesting in the course work (Winn, 1993). Similarly, participant 9 suggested that VR reflects "a change from traditional teaching methods to modern teaching methods. This shift helps lecturers create dynamic educational environments to foster the interest of students in the work of the course. Six participants also discussed VR devices such as VR head-gears and VR platforms such as second life which can build virtual teaching environments to cultivate students' interest in the course work.

#### 3.2. Ease of Use of VR

This theme focused on the participants' reflections on the ease of using and understanding of VR systems in the context of teaching and learning. Most participants briefly stated "Sometimes the complete understanding of a concept becomes difficult to achieve, essentially when it is very abstract or complex. Showing it with virtual reality in all its dimensions will also promote its perception and proper processing".

Six participants proposed instruction as a way to bring lecturers to VR. Five of the other participants argued that even though the VR is completely applied, preparation will continue. This will allow VR users to keep up to date with new developments and updates inside the VR arena. Participant 6 addressed that the VR systems would require preparation for both lecturers and students to use and understand. Participant 3 also claimed that the 3D visual interactions made the content absorbed much better. In this fashion, the enjoyment of learning also far outweighs other methods. For students this should become available; the earlier, the better. Many VR apps provide an opportunity to improve student participation.

#### 3.3. Challenges to the Adoption of VR

Most participants commented on VR adoption challenges from an infrastructural and financial perspective. We proposed that the University conduct a cost-benefit study to determine the financial viability

of using VR for teaching and learning. Respondent 8 referred to the fact that 'VR adoption requires long-term planning; the university is not quite prepared for it at the moment in terms of the requisite infrastructure, but maybe it will be possible to implement VR in the future:

Similarly, participant 5 recommended: “The University will take as much time as is required, not less than two years, to decide on the disciplines in which the VR is to be implemented”.

Most participants suggested a gradual adoption of VR as a solution to the challenge of current feasibility. Also, other participants advocated having policies for the adoption of VR. These participants expressed that those policies should be optional in order to prevent forcing the adoption of VR to limit instances whereby lecturers would adopt VR to adhere to the university rules instead of adopting it to its full potential. One participant argued that pilot studies across disciplines should be conducted prior to the decision to adopt VR at the University, as this would enable the University to gain insight into the capabilities and potential challenges of adopting VR for teaching and learning.

### 3.4. VR Skills

Some of the participants suggested outsourcing of VR skills to solve the issue of a lack of VR skills among the staff members. By contrast, some of the participants recommended getting VR skills by training existing staff members. Some of the participants explained that the University did not have qualified staff who were familiar with utilizing VR. Training would, therefore, be fundamental, but it should be complemented by recruiting new staff who have skills in VR.

## 4. CONCLUSION

As educators who teach in the experience age, we must embrace and leverage better methods to deliver the most effective learning experiences. Educators have begun to embrace VR and its vast possibilities for learning as the technology rapidly moves to the mainstream. As discussed above, VR is especially useful for providing several opportunities: increasing student engagement; providing constructivist, and supporting creativity and the ability to visualize complicated models. A strong reason for utilizing VR as a learning tool is that it meets young students experientially, a way that they prefer (Hu-Au & Lee, 2017). Our current education system needs engaging, authentic experiences that will drive successful learning. VR can provide this and offers the potential to expose students to worlds and people that are generally inaccessible (Dalgarno & Lee, 2010). For example, an intended use of the social affordances of VR could connect students with role models, thus encouraging greater participation by students who typically shy away from certain fields.

It should be pointed out that VR is no silver bullet; we must be wary of the tempting novelty of the technology and its initial hype – which is often followed by disillusionment. Thorough research and practice are necessary to explore the full potential of using VR in educational settings. As Lau and Lee warn against replacing real-world educational experiences with virtual reality, they also emphasize that “the best way to use virtual reality in learning is to create experiences that help students to understand the learning context better.” A pedagogy based on the unique affordances of VR is what is needed. A wrong way of implementing VR in education would be simply to replicate face-to-face, academic experiences of learning. Instead, we should design creatively while building on how we know students learn. Problem-based learning, anchored instruction, cognitive apprenticeship, and intentional learning environments are all effective models founded on constructivism (Green & Wilson, 2012). VR has the potential to enrich these methods with interactive simulations and stunning visuals that immerse students in authentic learning experiences. It can push the boundaries of the traditional classroom to be engaging, creative, and responsive to the needs of the student.

## REFERENCES

- Collins, J., Hammond, M., & Wellington, J. (1997). *Teaching and Learning with Multimedia* (1st ed.). <https://doi.org/https://doi.org/10.4324/9780203441305>
- Dalgarno, B., & Lee, M. J. W. (2010). What are the learning affordances of 3-D Virtual environments. *British Journal of Educational Technology*, 40(6), 10–32. <https://doi.org/DOI: 10.1111/j.1467-8535.2009.01038.x>
- Green, D., & Wilson, P. H. (2012). Use of virtual reality in rehabilitation of movement in children with hemiplegia - A multiple case study evaluation. *Disability and Rehabilitation*, 34(7), 593–604. <https://doi.org/10.3109/09638288.2011.613520>
- Hartley, M. M., Ludlow, B. L., & Duff, M. C. (2015). Second life: A 3D virtual immersive environment for teacher preparation courses in a distance education program. *Rural Special Education Quarterly*, 34(3), 21–25.
- Hu-Au, E., & Lee, J. J. (2017). Virtual reality in education: a tool for learning in the experience age. *Int. J. Innovation in*

- Education*, 4(4), 215–223.
- Javidi, G. (1999). *Virtual Reality and Education*.
- Karaman, M., & K. Ozen, S. (2016). A survey of students' experiences on collaborative virtual learning activities based on five-stage model. *Journal of Educational Technology & Society*, 19(3), 247–259.
- Kozhevnikov, M., & Gurlitt, J. (2013). Learning relative motion concepts in immersive and non-immersive virtual environments. *Journal of Science Education and Technology*, 22(6), 952–962.
- Lan, Y.-J., Hsiao, I. Y. T., & Shih, M.-F. (2018). Effective Learning Design of Game-Based 3D Virtual Language Learning Environments for Special Education Students. *Educational Technology & Society*, 21(3), 213–227.
- Lau, K. W., & Lee, P. V. (2015). The use of virtual reality for creating unusual environmental stimulation to motivate students to explore creative ideas. *Interactive Learning Environments*, 23(1), 3–18.
- Mantovani, F. (2001). 12 VR Learning: Potential and Challenges for the Use of 3D Environments in Education and Training. *Technology and Education*, 207–226.
- Muijs, D., Campbell, J., Kyriakides, L., & Robinson, W. (2005). Making the case for differentiated teacher effectiveness: an overview of research in four key areas. *School Eff. School Improv*, 16(1), 2005.
- Pantelidis, V. . (1993). Virtual reality in the classroom. *Educational Technology*, 33(4), 23–27.
- Pantelidis, V. . (2010). Reasons to use virtual reality in education and training courses, and a model to determine when to use virtual reality. *51–70 Themes Sci. Tech. Educ*, 59–70.
- Robertson, G. G., Card, S. K., & Mackinlay, J. D. (1993). Information visualization using 3D interactive animation. *Communications of the ACM*, 36(4), 57–71. <https://doi.org/10.1145/255950.153577>
- Winn, W. (1993). A Conceptual Basis for Educational Applications. In *Technical Report TR-93-9, Human Interface Technology Laboratory—University of Washington*.
- Yahaya, R. (2007). *Immersive virtual reality learning environment : learning decision-making skills in a virtual reality-enhanced learning environment*.