IMMERSIVE TECHNOLOGY FOR PRACTICAL LEARNING USING AUGMENTED REALITY

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Abstract: The diversity of student profiles indicates the need for an appropriate time and place of study. Therefore, Universitas Terbuka as an open and distance education institution has a challenge to provide learning services that can meet the needs of its students with flexible learning opportunities. One of the learning assistance services for students at the Universitas Terbuka (UT) began to develop learning media that utilizes the concept of immersive learning for students to get meaningful experiences by doing practical learning. To produce video media in one of the practical courses in the Undergraduate Educational Technology Study Program, Universitas Terbuka students need complete production equipment such as cameras, lights, audio, and camera mounting, to achieve competence in video-making practice. One obstacle is that students do not have this equipment or do not have access to learn to use it. Can augmented reality media be accepted as a learning medium that suits student needs? UT developed augmented reality technology to facilitate learning by referring to the principle of distance learning. The research uses a correlation study between technology acceptance and experience using augmented reality with Universitas Terbuka student respondents, especially the Educational Technology Study Program. The results found that students received technology as evidenced by the correlation between technology acceptance and experience using augmented reality.

Keywords: augmented reality; immersive; practical learning

INTRODUCTION

Interaction in the learning process develops over time with the presence of various communication technology devices. The interactions that occur in the online learning process are popularly known as synchronous interactions and asynchronous interactions. Teaching methods that apply hybrid teaching are known to have several advantages such as motivating the learning process, providing opportunities for faculties to add learning instructions and increasing student learning capacity (Nancy et al., 2020). The interaction between teachers and students in higher education can relate to the use of communication technology. Learning environments that prioritize modern practices can be facilitated through learning management systems, digital materials such as online-based teaching materials and online video conferencing facilities (Ntaba & Jantjies, 2019). Education held online is considered to have the capacity to deliver learning instructions flexibly in

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a learning environment that utilizes communication technology in student-centered learning (Kaur & Gopal, 2021). The presence of online distance education can overcome several communication barriers with the presence of learning materials. Although there are differences in distance and time, learners can still follow the learning process according to their time needs with independent learning and improve their abilities, gaining knowledge from media developed as learning resources.

Efforts to deliver teaching materials for distance education students become efficient and flexible with technology that can be accessed by mobile anytime and anywhere. The use of virtual media such as augmented reality and virtual reality from the beginning is applied to learning situations, in real terms both can improve learning outcomes. Furthermore, empirically it can bring pleasure to students even though they vary in context and subject (Huang et al., 2019; Sdravopoulou et al., 2021). The fusion of virtual objects and the real world is the result of computers' ability to create interactive scenarios that occur in real time, such as augmented reality that provides unique experiences to students. Learning experiences using augmented reality can encourage thinking skills, improving conceptual understanding of phenomena that are difficult to observe and understand well. Augmented reality offers interactivity and immersive features that can encourage students to engage in meaningful learning activities and potentially even increase motivation (Khan et al., 2019). Understanding programming languages can be easily mastered by some students who already have basic knowledge of mathematical logic. Concept diagrams used to find solutions to a programming language problem can be presented graphically to make it easier for students to complete programming instructions using augmented reality multimedia markers. This facility instantly visualizes the results of command execution on an integrated programming system, using augmented reality cues so that students can experiment and observe the results of their experiments themselves (Boonbrahm et al., 2019).

Acceptance in the context of research measures how far a particular user uses a smartphone-based application, which expresses user satisfaction with the application product and user attitudes towards the application including the user's desire to stay engaged using the application. Based on the findings, in general the use and acceptance of the application is considered good, users can understand the features of the application, actively use the application, and have the intention to continue using the application, especially if accompanied by training using the application (Alessa et al., 2021). Research on the acceptance and adoption of virtual technologies, focusing on the aim to examine the impact of five perceived factors on usability, perceived ease of use, perceived enjoyment, and visual appeal and computational effectiveness in higher education, as well as to investigate these relationships. between academic achievement and the application of the three dimensions of virtual world (3DVW). The results of this study reveal that perceived benefits, ease of use, perceived enjoyment, and visual appeal are the rationale for the adoption of the 3DVW learning platform on e-learning in higher education.

Technology adoption also has a significant impact on academic outcomes, student satisfaction, engagement, and retention of student outcomes in higher education. This technology has the potential to be accepted and adopted as a distance learning platform in higher education (Ghanbarzadeh & Ghapanchi, 2019).

As one of the learning assistance services for Universitas Terbuka students, marker-based augmented reality learning media has been developed. This media utilizes the concept of immersive learning as a means of gaining an understanding of practical learning materials regarding the introduction of video production tools. Augmented reality media and virtual reality media in other courses are specifically designed at the Universitas Terbuka, to support students to achieve practical video making competencies. Preliminary research studies in 2020 on first-generation augmented and virtual reality have been conducted to determine the use of media. This media is an integrated design with online tutorials for semester 2020.1 (March to June 2020) to semester 2020.2 (September to November 2020), conducted by a team of lecturers and instructional designers of the Universitas Terbuka Undergraduate Educational Technology Study Program (Marisa et al., 2022). Based on various studies that focus on the use of augmented reality, there are opportunities to utilize augmented reality as a learning medium that helps students to practice and learn video production equipment to support the video making process. Meanwhile, open and distance education students live scattered throughout Indonesia. The purpose of this study was to analyze the relationship between technology acceptance and experience using augmented reality in open and distance higher education, particularly practical courses.

METHOD

The design of this research method is designed with quantitative methods through surveys to augmented reality media users, namely students of the Educational Technology Study Program who take the Media/TV Production course. As users, students are given questionnaires containing the ease of use and usefulness of augmented reality media in their learning process. These two aspects are a measure in the acceptance of technology that focuses on the use of augmented reality-based learning media. Data collection was carried out using purposive sampling method and one-shot case study research design.

Table 1. Likert-scale Response Statement

Statement	1	2	3	4
Augmented reality media is useful for studying and deepening lecture material.				
Augmented reality media is useful for doing college assignments.				
Augmented reality media is useful for independent learning.				
Augmented reality media is easy to use for discussion.				
Augmented reality media is easy to use and easy to access.				
Augmented reality media is easy to use and understand instructions.				

The research instrument is in the form of questions about user experience adapted from the User Experience Questionaire rating scale using the Likert scale 1-4, represents disapproval to the point of being very agreeable. The research sample is students in open and distance higher education, in Online Tutorials in 2020 and 2021 as the research population. The data collection time is from May to October 2022. The research subjects were taken from students of the S1 Educational Technology study program as respondents in their activities utilizing augmented reality media for practical learning.

RESULT AND DISCUSSION

Most of the respondents, a total of 73 people, agree with the items in the statement about the Augmented Reality User Experience variable, where the Technology Acceptance variable is 94.39% totally agree. In general, students said that the experience of using augmented reality met expectations because it was visually appealing, presented real-life situations that were close to reality, attracted attention, and was not difficult to use. with the benefits of modern, creative, efficient, and innovative means. Through the results of data processing regarding the frequency distribution of respondents' answers to approval of the experience variable using augmented reality is shown in the following table.

Tabel 4.3 Learning Experience - Frequency of Answers (%), Mean dan Std. Dev

Item	1	2	3	4	$\overline{X}$	sd
LE1	0	1,4	78,1	20,5	3,19	0,43
LE2	0	5,5	65,8	28,8	3,23	0,54
LE3	1,4	2,7	75,3	20,5	3,15	0,52
LE4	1,4	6,8	75,3	16,4	3,07	0,54
LE5	1,4	2,7	79,5	16,4	3,11	0,49
LE6	0	6,8	71,2	21,9	3,15	0,52
LE7	0	4,1	74	21,9	3,18	0,48
LE8	0	5,5	72,6	21,9	3,16	0,50
LE9	0	5,5	78,1	16,4	3,11	0,46
LE10	0	6,8	76,7	16,4	3,10	0,48
LE11	0	8,2	78,1	13,7	3,05	0,47
LE12	1,4	2,7	74	21,9	3,16	0,53
LE13	0	9,6	71,2	19,2	3,10	0,53
LE14	0	8,2	78,1	13,7	3,05	0,47
LE15	0	1,4	74,0	24,7	3,23	0,46
LE16	0	5,5	71,2	23,3	3,18	0,51
LE17	0	2,7	78,1	19,2	3,16	0,44
LE18	0	0	68,5	31,5	3,32	0,47
LE19	0	0	67,1	32,9	3,33	0,47
LE20	0	0	68,5	31,5	3,32	0,47
Average	0,28	4,30	73,77	21,63	3,17	0,36

Based on the results of the correlation test, it is known that the variable of technology acceptance has a correlation with the variable of experience using augmented reality. The calculated *r-value* price was found to be 0.76 > the table *r-value* was 0.23. It can be interpreted that the high and low level of experience using augmented reality can be determined from the high and low acceptance of technology owned by respondents. This means that if the acceptance of technology increases, the level of experience using augmented reality also increases. Predictions with the concept of the Technology Acceptance Model (TAM) that have been initiated previously reflect aspects of usability felt by users and ease of using technology (Billanes & Enevoldsen, 2021). This shows a positive relationship between the acceptance of technology and the experience of using augmented reality.

CONCLUSION

The popularity of augmented reality extends as digital-based game software advances. Augmented reality users will experience their presence in a hybrid multidimensional space, so they will have a location-oriented experience in communication and virtual games. Based on a brief interview with the tutor who teaches the Video/TV Media Production TPEN4314 course, information was obtained that the use of augmented reality in open and distance education has a different concept based on the principle of distance learning (self-learning and self-instruction) with the use of face-to-face conventional educational institutions. This has answered hypothetical questions about the collective influence of student technology acceptance on augmented reality experiences in open and distance higher education. Implications on open and distance higher education, the availability of augmented reality media has advantages as a source of student learning to practice. The diversity of students' initial abilities and learning experiences can be facilitated by the availability of innovative learning resources and novelty designed with instructional strategies that are tailored to their needs. The knowledge gained by students based on experience using augmented reality is concluded to facilitate personal practical learning, while based on learning objectives that focus on the competence of producing video media also requires collaboration between individuals and a combination of various skills. In the future, further research is expected on the study of augmented reality in collaborative learning on distance education.

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