
The Use of Augmented Reality in Distance Language Learning in Indonesia and Singapore: A Descriptive Study with Survey Methods

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ABSTRAK

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This study aims to describe the use of Augmented Reality for student's distance learning in Indonesia and Singapore. This study is descriptive research with a survey method. The survey was conducted with 39 student's distance learning. Data is collected using Google Form questionnaires. Data analysis is carried out by calculating the frequency and is presented as percentages. Participants in this study were chosen randomly for data variation. The presentation of data is carried out qualitatively based on the respondents' answers to the questions asked. The study participants argued that augmented reality was feasible, even though it was recognized as encountering obstacles. Based on the results of a survey conducted has made AR and VR more viable and desirable in many fields, including education, digital platforms are used to support online learning. The platforms used are WhatsApp and video conferencing, such as Google Meet. Integrating technology is considered important for students to support the learning process. Conscious and planned efforts and student motivation are critical to increasing their experience and skills in utilizing technology in learning.

Key word : Augmented reality, distance learning, hybrid model

INTRODUCTION

The advancement of information and communication technology greatly influences the world of education, and distance ly in supporting the learning process. The use of technology to support learning has become synonymous with 21st-century learning. Technology development gives rise to various learning models that are more varied and innovative. Students have been pushed even more to adapt to changes in this age of globalization by using different apps from different digital learning platforms. The development of science and technology led to a significant shift toward the practical era. The value of adopting virtual reality in education and learning is related in part to the fact that this technology can improve and facilitate learning, increase memory capacity and make better decisions while working in entertaining and stimulating conditions. In fact, when we read

textual content (on a printed document for example), our brain uses a process of interpretation of everything we read, which increases our cognitive efforts (Şenel, 2020).

The development of information technology in the education sector has penetrated management and learning in the classroom. The use of this technology is in line with the development of society 5.0, an era where technology is part of the human being itself. The essence of technological progress and development in the era of society 5.0 is how technological developments can minimize gaps in humans (Ruzow Holland, 2022). In accordance with 21st-century learning, one related to the use of technology, its implementation in learning should be able to usher in an understanding of information, media, and technology skills.

The role of technology in education includes making it easier for students and students to

engage in the learning process (Pellegrino et al., 2013). Furthermore, the role of other technologies revealed by technological advances in the learning process can allow students and students to not meet in person but instead use the internet and other technologies. Digital technology has begun to be used in educational institutions as advice to support learning both as an information tool to access information and as a learning tool, namely as a means of supporting learning activities and assignments (Polmear et al., 2020). The use of technology can be used for children with student's distance learnings, edistance ly as a learning medium. The use of technology for children with student's distance learnings is one way to reduce limitations in their learning. The limitations in learning whose impact have been felt in almost all corners of the world were evident during the emergence of the COVID-19 pandemic outbreak. One of the limited interactions between students and students is a problem experienced by most students during a pandemic (De Micco et al., 2022).

The COVID-19 pandemic ushered in a major change in the implementation of education. Pandemic conditions at that time required the full implementation of learning to be carried out hybrid or online. Online learning may be effective despite other obstacles. The obstacles include the readiness of learning devices in augmented reality to the readiness of students and parents to carry out full augmented reality.

Along with the ongoing pandemic journey, educational institutions, students, and students continue to adjust to the challenges of the learning

The formulation and implementation of the learning process in distance education units are still being pursued in line with the COVID-19 pandemic. The combined learning model between virtual and limited face-to-face in the new normal transition period is still running by adhering to strict health protocols. The hybrid model formulation is implemented to transition to the new normal era by combining face-to-face and virtual learning.

Various challenges in implementing learning in the new normal transition period in distance education units are still widely encountered. During an emergency in the new normal transition era, several challenges were found in learning, such as learning media that was not optimal, limited internet access, low learning

process (Müller et al., 2021). Limited conditions due to the implementation of social distancing due to the pandemic gave rise to the application of a blended learning approach online or synchronously and through limited face-to-face. The condition of the COVID-19 pandemic has gradually slowed down and ushered in regulations regarding implementing limited face-to-face learning (PTMT). The circular letter of the Minister of Education and Culture No. 3 of 2022 provides options for participating in limited face-to-face or distance learning. Augmented reality is an alternative that can be chosen to carry out the learning process while still implementing health protocols.

The augmented reality model is a learning model designed by combining face-to-face learning with the use of computer and internet technology. The use of the internet is intended as a support for the learning process that provides new learning options and experiences to access various learning resource. Furthermore, it allows learning to happen anywhere and anytime and encourages students to learn actively. In line with on augmented reality, it is seen as an ideal learning method in the new normal era after the COVID-19 pandemic, which presents the option of combining traditional classes with the use of digital devices to support learning [14]. Augmented reality is considered an effective learning model for distance-limited learning that combines synchronous interaction with online learning delivery (Huang, 2013; Lengyel et al., 2019).

motivation, and irregularities in the learning process. One of the challenges encountered based on observations and survey results is the lack of readiness of students to prepare learning media that supports the implementation of augmented reality. The lack of variety in the selection of learning media known by students is suspected because they are unfamiliar with the various existing technology platforms.

Based on previous studies, augmented reality found various challenges, such as educator readiness, learning support facilities, and so on, both for educators and students. It is in line with the findings in the field related to the implementation of learning during the transition period of the COVID-19 pandemic, which come from the readiness of parents of students with

student's distance learnings for electronic devices that will be used in augmented reality. The readiness of students in the use of technology is also an important thing to consider in maximizing augmented reality (Listiani et al., 2019; Sgora & Chatzimisios, 2022). The role of the student becomes important that in the conventional learning process to augmented reality. This must be considered as an effort to ensure that the learning process runs effectively and in pleasant conditions, even in limited conditions. Learning challenges in the new normal era require modifications to the learning process, so resilient students are needed in this new normal era.

Student experience in learning various digital platforms is a supporting factor for the optimal use of technology in learning. Students must be able to master media and applications that support teaching and learning activities. Challenges show that students are not ready to hold current learning related to technology. This is reinforced by the fact that in the field which shows the variety of technology used for teaching is still limited. Students recognize the difficulty of adapting to existing technological developments. The reason students are constrained by adapting to technology is related to age, busyness, and other things. Efforts made by students in addition to continuing to adapt can be made by taking time to take part in existing training. The psychological readiness of educators to implement augmented reality (online and offline) is determined by attitudes, knowledge, and ability to integrate learning content into technological devices (Aziz et al., 2020). This readiness will affect how students adapt to existing technological developments so that they will feel easy in helping to deliver material in the learning process.

This study focuses on the use of technology used by students in accommodating learning with this hybrid model. This study focuses on answering research questions related to technology-based media, such as what is used by students in supporting augmented reality. This study also focuses on the understanding and experience of students, and student perceptions of the use of technology that supports augmented reality. This study also knows the role of technology in supporting augmented reality for students with student's distance learnings

RESEARCH METHOD

This study used descriptive research with a survey method. The aspects developed in the questions on the list of questions in the survey are divided into several parts. The first part of the list of questions in the survey asks about the demographic aspects. The distribution of teaching levels and the specificity of student respondents in distance education schools in this study varies. Teaching levels vary from pre-primary, primary, junior high, to senior high schools. The student's distance learnings of students who are taught vary from visual impairment, hearing impairment, mental impairment, deafness, autism, and slow learning (Creswell, 2012; Solt et al., 2011).

Furthermore, the second part of the list of questions contains the categories of technology used by students in supporting augmented reality. Then, the third part contains a list of questions that gather information about understanding and perceptions about the use of technology to support augmented reality. Before carrying out data collection, first collect information about the number of distance education schools in Balikpapan that carry out augmented reality in the post-pandemic period, one public school and one private school. The respondents in the study were distance education students who taught in distance education school in Balikpapan City, Indonesia. Students range in age from 31 to 40 years old, with the youngest being 21 to 30. Most students teach at the primary school level with a student age range of 7-12 years old. Most respondents were between the ages of 31 and 40 and were most dominant in teaching primary school students with intellectual disability. The respondents to this study were 41 distance education school students who filled out a survey in Google Form. The data collection procedure was disseminated by snowball by sending a Google Form survey to WhatsApp groups of distance education school (SLB) students in Balikpapan City.

Data collection in this study was carried out by providing questionnaires online using Google Form. The questionnaire validated with expert judgement and consulted to expert practitioners who are distance education students. Data analysis was carried out descriptively by calculating the frequency of the statements chosen by the respondents. The obtained value is converted into a percentage to describe the proportion of each statement selected and

disclosed by the respondent.

RESULTS AND DISCUSSION

Through the survey results, data was collected about the technology platform used to support augmented reality. The data collected from distance education students with variety of student's distance learnings students. Most of reponden are student for student with intellectual disability. The results are outlined in Table 1.

Table 1. Technology platforms in augmented reality

Variable	Group	n	Percentage
Utilization of technology/media used to support augmented reality*	WhatsApp group	35	85.4
	Video conference/web meeting	20	48.8
	Student worksheets (LKPD) online	17	41.5
	Video online/offline	13	31.7
	Google Classroom	7	17.1
	Make use of the learning portal	5	12.2

*Respondents chose more than 1 answer

From the data obtained based on the survey results, and in line with the experience of distance education students in utilizing technology, most choose the use of WhatsApp as a medium to support augmented reality. In supporting the implementation of the learning process, the WhatsApp group is one of the applications that is familiar and widely used as a communication tool, including in the educational environment where this is in line with opinions. Other technologies that distance education students have used in supporting the learning process with a hybrid model include using other digital

platforms such as video conferencing to provide online and offline videos and using Google Classroom.

In line with the study which found the digital platforms that are most often used to support learning, edistance ly when in the network (hybrid), namely WhatsApp groups, video conferences, and the use of Google facilities such as Google Classroom. One of the reasons for choosing the use of WhatsApp, video conference, and Google Classroom is because it utilizes the technology that has been provided and is quite familiar. The use of WhatsApp group, video conference, and Google Classroom is an option other than because the features that are indeed free also tend to be familiar to use because previously students have received training, edistance ly in utilizing Google features. The use of a learning management system is not an option because most students are not familiar with it and do not have experience developing it to support learning in distance education school.

The data showed the understanding and experience of students in distance education in managing learning with the use of technology, edistance ly with a augmented reality model. Based on Table 2, during the implementation of hybrid or augmented reality between hybrid and face-to-face learning. There are several inhibiting and supporting factors in implementing augmented reality. The application of learning with a hybrid model requires much reassessmen

Table 2. Students' understanding and experience, edistance ly in the use of technology to support augmented reality

Variables	Group	n	Percentage
Augmented reality implementation	It has been done	3	31.7
	Simply done	7	65.9
	Not yet done		3.7
Interaction between students and students with student's distance learnings in the use of technology for augmented reality	Less		9.8
	Enough	8	43.9
	Good	8	43.9
	Excellent		7.3
The importance of students being able to understand technological developments and integrate them in learning	Yes	1	100
	Not		0
Efforts made to improve understanding and skills in the use of technology in learning	Self-study	9	70.7
	Join a webinar	6	63.4
	Ask colleagues	2	78

This survey showed obstacles to implementing augmented reality, edistance ly in online learning. The obstacles encountered are related to the limitations of students with student’s distance learnings in accessing learning technology platforms, the use of technology, and the readiness of students to use digital platforms for learning. It needs to be considered because the use of technology as a learning medium will be interrelated and influence the implementation of learning.

One of the obstacles to using technology from a student’s perspective in augmented reality is the readiness of students to adapt to technology. The era of education in the industrial revolution 4.0 towards society 5.0, characterized using digital technology in the learning process, requires students to adapt. The obstacles students encounter, edistance ly in developing teaching creativity, are not due to limited facilities but the competitive power of students that needs to be grown. Student competence is the main key to successful learning, edistance ly related to the use of technology in this COVID-19 transition period. Students must continue to learn and innovate to adjust knowledge and abilities in the industrial era 4.0. Furthermore, to improve understanding and skills in the use of learning technology, most students stated that asking colleagues is an effort made to upgrade their understanding and skills in the use of technology (Lestari et al., 2023; Wibowo et al., 2023). The presence of technology colors the challenges in the application of learning with a hybrid model. To maximize the augmented reality model, students should be able to harmonize face-to-face and online learning

sessions by maximizing the use of technology in learning.

There are several factors that support and inhibit students from innovating and developing teaching creativity by utilizing technology. From students’ perspective, there are still challenges in using a distance technology for students with a lower middle economy who do not have devices and the availability of inadequate internet networks. One of the challenges of augmented reality is seen from network factors, students themselves to student understanding in this augmented reality technique. Learning in the new normal era in the learning process is also inseparable from parental support, namely the availability of adequate communication tools for learning.

Table 3 unravels several things that need to be considered in using technology for students with student’s distance learnings according to the perception of distance education students. The survey showed that infrastructure, students with student’s distance learnings, and students’ abilities are interrelated in using technology. Regarding infrastructure related to the use of technology, some things must be considered to support learning according to the student’s perception. It includes the availability of networks and supporting facilities and the use of technology that is easy to use and adaptive for students with student’s distance learnings. The readiness related to infrastructure, edistance ly related to technology, support digital-based learning, which needs to be prepared, edistance ly in augmented reality (Mambu et al., 2020; O’Shea, 2011; Widian tara et al., 2014).

Table 3. Students’ perceptions of the use of technology for learning for students

Reviewed from the facilities	Reviewed from students’ abilities	Judging from the student’s ability
1. It will be carried out if the internet network is adequate	1. Media decisions must be adapted to student’s abilities and needs.	1. Need collaboration and cooperation with parents
2. Utilizing technology such as video conferencing applications and other digital platforms	2. The technology used should be accessible to students with student’s distance learnings	2. Students should learn about technology and information technology or IT utilization
3. The chosen technology should be easy to use	3. Adapted to the learning characteristics of students with student’s distance learnings	3. Students must adapt to current conditions and situations
4. The chosen technology should integrate visual and audio elements	4. Students should be familiarized with the use of technology that facilitates learning	4. Students can sort out the use of technology to create effective online learning
5. The use of technology must be varied and interactive		5. Students must be able to be creative in developing and creating media
6. Technologies that support learning should be adaptive for children		6. Students must take the initiative to improve IT understanding, one of which is through training

Then on the perception of students regarding the use of technology that supports augmented reality, they must also consider matters related to student abilities. The selected technology should be tailored to the needs and align with the student's abilities. Because technology is presented to facilitate the learning process, the use of technology should be able to consider accessibility or ease for students to access learning. The principle of technology selection in learning should also consider the student's characteristics. Then it becomes important to equip the knowledge and experience of the student in utilizing the technology because this is part of the student's knowledge of the developing technology.

Furthermore, in terms of student perception and student ability, several recommendations were obtained related to the efforts students must make in using technology to support augmented reality. Augmented reality that combines face-to-face and online learning requires collaboration between students and parents. It is done to ensure that the learning process that occurs at home with a hybrid can be carried out. Students must be able to adapt to any situation related to implementing learning for students in any mode. Then it is important to teach students how to use technology and give them practice because it is significant for students to get used to new technology.

Moreover, the survey results stated that distance education students, represented by 41 distance education students' respondents, agreed that students should always upgrade their understanding and experience related to technology and information. Student competencies related to the use of technology must always be developed as a form of adaptation to the development of the current digital world. The Regulation of the Minister of National Education Number 16 of 2007 stated that information and communications technology or ICT competencies for students have at least two functions, they are: i) Self- development; and ii) Supporting the learning process. The determination of this competence is a logical consequence considering the large influence of ICT in the learning process and line with the rapid development of the digital world.

The use of technology in learning is an effort to improve the quality of learning. The use of technology in supporting learning must be in line

with the ability of students to take an active role in the learning process according to the needs of students. Technology can be used as a support for learning and learning materials so that it is in line with the desired learning objectives. The role of technology is important in facilitating educators in delivering learning materials so that learning continues even though it is not carried out face-to-face.

All the above related to the use of technology in augmented reality for students with student's distance learnings certainly also need support and readiness. Managing a augmented reality model requires careful readiness of all components involved. The most important readiness is related to the curriculum in managing augmented reality models. In addition, participation in augmented reality is dependent on the readiness of infrastructure, students, and school staff to manage augmented reality models, and finally, students are invited to participate.

From the COVID-19 pandemic to the post-pandemic, digital technology is still considered a solution to the continuity of education. Technology provides facilities that make education more meaningful amid existing limitations. Learning that is carried out online ushers in freedom for students to develop innovations both in teaching methods and in the development of learning media using various existing platforms to support learning. According to the findings of this study, in addition to using WhatsApp group to communicate with students or parents or guardians of students, students have also become proficient in using various web meeting applications to conduct teleconferences, utilize gadgets, access existing digital platforms, develop learning materials online, and even go so far as to design asynchronous learning using Google Classroom. Hybrid digital learning with the help of digital applications.

Readiness in infrastructure can be encouraged through increasing school readiness in fulfilling learning support infrastructure led by the principal as a team leader. The principal drives the readiness of both infrastructures, educators, and education staff and students' readiness to be ready for augmented reality by ensuring curriculum readiness. Educators and education staff are formulated to be creative and innovative in developing learning by integrating technology to make it more mature when carrying out

augmented reality. Students are also starting to be introduced to technology, which in the case of distance education schools, requires involvement with parents to support learning based on information and communication technology to minimize obstacles in augmented reality.

In line with post-pandemic conditions, the learning process continues while maintaining strict health protocol standards. Learning with a hybrid model as an alternative to learning that combines hybrid and face-to-face learning certainly requires appropriate technology to ensure sustainability. Students have a perception of the use of technology using their understanding and experience so that they can know, understand and be aware of the condition. Therefore, from the perception or interpretation process comes a response, confidence, and hope from using technology to support learning for students with student's distance learnings.

The development of technology in education ushers in the understanding that technology supports learning and continues to develop along with the rapid development of technology. Technological developments are related to developing sophisticated things, one of which is in the world of education (Asher et al., 2011; Suprpto et al., 2023), namely cyber teaching, or virtual learning. Virtual learning, of course, cannot be separated from internet use. The development of sharing digital platforms that can support and facilitates learning and teaching. It takes creativity and innovation from students to take advantage of the potential, especially in the use of technology, so that learning can take place, especially in augmented reality.

The role of technology in supporting augmented reality for students with student's distance learnings helps student to in ensuring learning process. On the other hand, it helps implement learning activities during a pandemic but is also considered less effective. In augmented reality, technology is used by distance education students to be able to carry out virtual learning and provide assignments and coordinate with parents, especially to accompany the learning process as long as they do not carry out offline learning. Some of the digital technology platforms chosen by most distance education students are digital platforms which are actually quite familiar to use, easy to adjust to parents' willingness (Mahadevan, 2002). The choice of using this technology is also

adapted to the various characteristics of students with student's distance learnings so that the simplest one is chosen and can be used adaptively according to the abilities of students.

The use of Whatsapp groups, Google Meet and also Google Classroom as the technology used in this augmented reality is based on the results of a readiness assessment that was previously carried out by each student on students, parents, infrastructure and also the student. The use of this technology is used to ensure that augmented reality that is carried out during the post-pandemic transition period can be carried out for students with student's distance learnings. The main thing in using this technology is that it must be adjusted according to assessments related to readiness both in terms of students, students, parents and supporting infrastructure.

CONCLUSION

The use of technology and media is effective in supporting augmented reality. The implementation of augmented reality requires a learning delivery tool to help students understand the learning material. Students use a variety of digital platforms such as WhatsApp, Google Classroom, video conference, and other applications. According to the student's view, it is important, especially for a student to understand the development of existing technology, especially for a student. The use of technology is considered to provide benefits not only to help students understand the material but also to try to build interaction between students and students in learning. The combination of face-to-face learning and learning to facilitate students learning certainly cannot be separated from using technology in learning.

Based on the analysis, students see that three important things need to be considered in using technology, especially to support learning for students with student's distance learnings. Regarding infrastructure, the selection of technology for learning should be able to choose technology that is simple and easy to use and adaptive technology for students with student's distance learnings. Furthermore, judging from the condition of students, the selection of technology as a learning aid should be accessible and adapted to the learning abilities and characteristics of students with student's distance learnings.

Then, in line with the student's perception of

using technology for learning, the distance education students agreed that it is important to upgrade knowledge and skills related to this. Students realize the importance of adapting to fast-moving technological developments to be applied in the learning process so that they can choose and sort out technologies that can be used to teach students with student's distance learnings. Students have tried to improve understanding and skills in using technology in learning, such as asking peers, self-studying, and attending existing training or webinars. Therefore, from the efforts students have made, students can design effective learning by developing creative learning media using existing technology.

This study implies that the use of technology can help distance education student in the implementation of augmented reality in the post-pandemic transition period in distance education school. The limitation of this study is that there is no validation related to measuring instruments used to dig up data. For further research, various assessments can be carried out so that this research can continue to explore information related to the use of technology to support learning for students with student's distance learnings. Further research needs to be carried out to validate the instruments used, and reliability calculations need to be carried out in this study.

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