Augmented Reality in Language Learning: Enhancing Student Engagement in a Third Language Subject

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Abstract
To improve student performance on the subjects studied, the fields of education and technology cannot be separated. Although technology has been used in Third Language Subject Education for a long time, student performance has been seen to decline from 2020 to 2021. In fact, the use of augmented reality (AR) multimedia technology continues to remain uncommon, particularly in third-language subjects at Universiti Teknologi MARA (UiTM). Due to the paucity of studies on the impact of using AR technology in the third language on student performance, this needs to be investigated. The use of AR in education and training can speed up instruction, be lightweight and portable, have clear content, and cost less to print. The purpose of this research is to determine how the use of AR-oriented multimedia technology affects student performance in third-language learning methods and lecturer roles. Data from questionnaires is collected using quantitative methods. SmartPLS 3.0 was used to analyse the data. A total of 387 UiTM students who took a third language course participated in the study. The analysis revealed that the use of multimedia had a significant impact on student performance, with the exception of the teaching strategy factor, which had no effect on student performance. Future proposals to broaden AR research into other areas of social science.
Keywords: Augmented Reality (AR), Third Language, Learning Method, Lecturer Role, Student's Performance

Introduction

Malaysian education has suffered a decline since the Covid-19 pandemic. The Third Language course at UiTM is no different. Arabic, Mandarin, Japanese, and Korean make up the Third Language. Malay students make up 91% of those studying a third language at UiTM. The lack of use of technology-based multimedia during teaching and learning has been identified as a weakness of UiTM students in mastering the Third (Abd Rahman et al., 2020). Distressingly, the third language proficiency of Malaysian students has been declining since 2020, as illustrated in the diagram below:
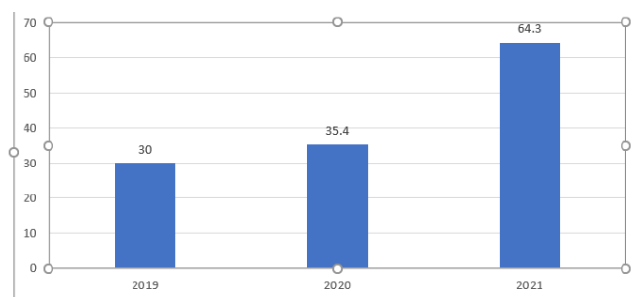

Figure 1. The Level Of Weak Students Increased

According to the above diagram, up to 35.4% of students were considered to be weak in 2020, and this number rose until 2021, when it reached 64.3%. Furthermore, if students use technology uncontrollably (Ismaeel & Al Mulhim, 2019), they may experience fear and become easily influenced by negative culture (Wibowo, 2022). Furthermore, environmental factors in Malaysia discourage students from speaking a third language. The influence of the mother tongue being used more frequently than the third language when communicating with classmates is also a factor that contributes to the infrequency of speaking during or outside of the learning session (Abdul Ghani et al., 2019). Students' confidence to speak is also undermined by a lack of vocabulary. As a result, students interact less in the third language and feel uncertain of word function. Students also lack compassion for what they learn in everyday life (Asbulah, 2021; Abdul Ghani et al., 2019). To address the aforementioned issues, the use of multimedia-oriented Augmented Reality (AR) as the most recent and appropriate teaching aids in learning methods can improve student performance.

This study will emphasize technology use in the Third Language course at UiTM based on recommendations for its use in teaching and learning. The Third Language is one of the important subjects that is also emphasized in the world of education, beginning with elementary school and progressing to higher education institutions. The Academy of Language Studies (APB) at UiTM provides students with a Third Language subject as a university elective (Sopian, 2019). As a result, this study is necessary to address the lack of research on the impact of the use of AR-oriented multimedia technology in Third Language subjects at UiTM.

The facts in Wibowo's study (2022) make it clear that educators must employ effective teaching techniques when imparting knowledge, which is another reason why this study is necessary. This can also result in an excellent generation, further elevating UiTM's standing as a world-class educational institution. The concept of giving birth to this exceptional generation is also consistent with the national education philosophy, which is to develop individual potential in a comprehensive and integrated manner in order to create a balanced and

harmonious human being in terms of intellect, spirituality, emotion, and body. As can be seen, the need for augmented reality multimedia technology should be expanded further. Its adoption among lecturers and students has not yet reached a commendable level (Zaini et al., 2019; Asbulah, 2021; Ismail et al., 2021). As a result, in keeping with UiTM's mission of producing lecturers and students with advanced technological skills (Statement of principle for Academic UiTM, 2022). This research should be pursued in the context of teaching a third language.

This study was also conducted in order to fulfil the government's objectives set forth in the National Science, Technology and Innovation Policy (DSTIN) 2021–2030 as well as the 10–10 Framework for Science, Technology, Innovation and the Malaysian Economy (MySTIE), in order to create new economic growth, particularly in the wake of the pandemic, by utilising technological components. The study's goal is to determine the impact of using AR-oriented multimedia technology on the performance of third-language students in the learning method and lecturer role.

Hypothesis
This study employs an alternative hypothesis based on previous research in the field of third language education.

H^1 The use of AR-oriented multimedia technology has a significant impact on student performance in the Third Language Learning Method.

H^2 The use of AR-oriented multimedia technology has a significant impact on student performance in the Lecturer Role.

Research Question
This study addresses two questions:

1. Is there an effect of using AR-oriented multimedia technology on student performance in the Third Language Learning Method?
2. Does the use of AR-oriented multimedia technology have an effect on student performance in the Third Language Lecturer role?

Literature Review
Quintuple Helix Model of Innovation

This study focuses on theories related to models such as the Quintuple Helix, which is a theoretical development of the Triple Helix concept. The Triple Helix concept is an industry development flow of creativity, innovation, and technology. The state, universities, and industry are the primary movers. The community was then added as the primary driving force in the Quintuple Helix Innovation Model. This model incorporates innovation and knowledge as growth strategies across all dimensions. As a result, government, academia, business, and the general public can foster creative ingenuity in the human race, thereby preventing the spread of disease. In this case, the business, economic, educational, and social sectors are interacting in an efficient, effective, and sustainable manner (Savitri & Deriawan, 2019). As a result, every sector must focus on technological innovation to ensure that the country continues to grow.

The Impact of Augmented Reality on Student Performance
AR is a technological audiovisual media medium that combines the real and virtual worlds in two or three dimensions (2D or 3D) (Kamaruddin et al., 2019). According to Ismaeel and Al

Mulhim (2019), augmented reality (AR) is a new teaching and learning technology that combines traditional learning with virtual objects such as voice, images, and animation.
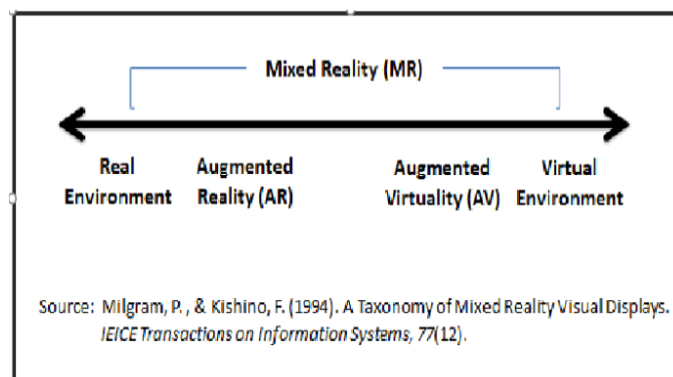

Figure 2. The AR Theoretical Framework

AR is a technology that can create an interesting environment by adding virtual objects to the real world, according to Figure 2 of Milgram's reality-virtuality continuum theory (1994). As a result, augmented reality (AR) plays a role in allowing users to see virtual objects as if they were in the real world. According to Shuhari et al (2020), there are numerous advantages to using AR, including the creation of a more effective learning and communication environment. Furthermore, Yoke et al (2019) found that AR is capable of high-level learning in terms of multimedia, visual, audio, and animation.

The study also discusses some of the benefits of using augmented reality in teaching and learning. It saves time, is portable, lightweight, has easy-to-understand content, and costs less to print. Additionally, Mostafa et al (2020) highlighted several benefits of AR in the field of education, one of which is to increase student enjoyment and excitement during the learning process. Furthermore, AR is used as an interactive learning model, which enhances student engagement.

The use of augmented reality (AR) in the field of third language learning has the potential to be explored, based on the benefits and positive impact described previously. AR technology can be widely used as a teaching aid in the future, but only at a basic and non-holistic level (Akashah et al., 2016; Sepasgozar, 2020). As a result, AR technology can be developed and used as a learning medium in the field of education (Alrige et al., 2021; Cahyani et al., 2021). The study of Norabeerah et al (2012) demonstrated that AR is used in various fields such as science, astronomy, and English. Furthermore, AR helps students master the Third Language more effectively because it incorporates an interesting 'edutainment' component. AR multimedia features such as video, graphics, two-dimensional, audio, and animation can also be used to integrate AR in the Third language (Salisbury, 2006). Despite having a positive impact, third-language effectiveness remains far behind (Akashah et al., 2016). AR technology can be used in games (Sepasgozar, 2020), language translation, vocabulary, sentence reading, and correct pronunciation (Alrige et al., 2021; Cahyani et al., 2021; Fauzan et al., 2020; Lubis et al., 2019). Thus, augmented reality (AR) is a new system that is rapidly expanding and has

the potential to improve the effectiveness of teaching and learning in order to meet educational technology goals in the future (Alrige et al., 2020).

Method of Instruction in Third Language Subjects
Blended learning is frequently used in modern language learning methods (Hasan, 2020; Mokhtar et al., 2019; Taib et al., 2019). Blended learning is a combination of various learning facilities in terms of delivery, teaching model, and learning style via media selection between facilitators and students. Blended learning methods combine in-person and online instruction. However, the method is broader, emphasising social interaction (Hasan, 2020). The use of AR multimedia technology improves student performance, motivation, and satisfaction in the Third Language Learning Method (Fauzan et al., 2020; Marin-Diaz et al., 2022)

Lecturer Role
Three key areas, namely competence, pedagogy, and motivation, can be used to assess the readiness of the lecturer's role. The competence of the lecturer includes his ability and competence in the field of knowledge and skills of the Third language. Lecturers must also constantly improve their teaching abilities in response to changing circumstances (Zaini et al., 2019). According to the current situation, all lecturers must now provide technology-oriented teaching materials teknologi (Boon, 2020; Greenhow & Chapman, 2020; Kessler et al., 2020). More regrettably, 0.6 percent of lecturers are unable to decide which technology is appropriate to use in a classroom (Bahrin et al., 2005). Although this percentage is considered small, it has a significant impact on UiTM students' learning. The ability of lecturers to use technology applications such as e-learning, kahoot, google meet, google classroom, and Mooc Teaching is medium, with an average of 2.5 (Ismail et al., 2021). This demonstrates the lecturers' willingness to equip themselves with skills that need to be improved until they reach a higher level of proficiency.

The following consideration is pedagogy. Effective, appropriate, and engaging teaching strategies are essential for ensuring that students master a third language. As a result, third-language lecturers are still unable to adapt to the current situation, causing students to receive inadequate language instruction (Ismail et al., 2021). As a result, lecturers should modify their teaching style to be more interactive and effective when teaching third-language subjects and adapt it to the environment.

Last but not least, when teaching the third language, the factor of motivation should also be emphasized. The motivation of a lecturer is a combination of seriousness, determination, and awareness of their profession. Lecturers play an important internal role for students because they can provide encouragement and polish students' potential, allowing students to remain confident in their ability to excel in language learning (Zaini et al., 2019). The aspect of workload should also be considered when examining the factor of low motivation among lecturers (Mokhtar et al., 2019). Overall, the use of technology in student-centered third-language teaching and learning should be doubled because it is more effective and affective than lecturer-centered learning alone.

Methodology

The primary data for this descriptive and analytical study was obtained through questionnaires administered to the undergraduate diploma and degree students from three UiTM campuses in Melaka which are Alor Gajah Campus, Bandaraya Campus as well as Jasin Campus. A convenient sampling technique was used in this study and the survey was conducted online using Google Form to collect the responses. The entire population for this study was 10000 students that came from six different faculties in UiTM Melaka which include the Faculty of Business and Management, Faculty of Computer Science and Mathematics, Faculty of Hotel and Management, Faculty of Accountancy, Faculty of Plantation and Agrotechnology and Faculty of Communication and Media Studies. The sample size for this study was 370 students that have been identified primarily by referring to Krejcie and Morgan's (1970) table. A seven-point Likert-based scale was adopted to represent the respondents' preferences. The description of the Likert scale used included 1-Strongly Disagree to 7-Strongly Agree. The data was next analysed using SmartPLS 3.0 software to gather the responses (Ringle et al., 2015). Before data analysis was initiated, a data cleaning process involving several tests such as incomplete data detection and isolated data was performed. Of the 394 questionnaires distributed, 378 questionnaires were retained for the purpose of further analysis due to incomplete responses from the remaining two respondents. Next, the Partial Least Square Structured Modeling (PLS-SEM) procedure was performed which involved two stages of analysis namely the item measurement model as well as the structure measurement model. Through this software, data would be re-sampled to as many as 5000 samples to produce expected standard error and t-value (Hair, 2011; Chin, 1998). SmartPLS 3.0 (Ringle et al., 2015) is able to assimilate sampling errors that can influence the value of correlation coefficients between the variables while improving the accuracy of theoretical tests (Hair et al., 2012). This software will also ensure the convergent validity and discriminant validity of the data.

Findings and Discussion

Demography

387 students from different faculties at UiTM Melaka participated in this study and answered the questionnaires that were given out. The majority of respondents (n=276, 71.3%) were female, with the remainder being male (n=111, 28.7%). The majority of respondents (n=290, 74.9%) had a degree, while only 97 (25.1%) had a diploma. The majority of third language courses (n=115, 29.7%), level two (n=102, 26.4%), and level one (n=77, 19.9%) were studied for a degree. They studied diploma at level two (n=84, 21.7%) and level one (n=9, 2.3%). Arabic had the highest percentage of course code (n=193, 49.9%, respected), followed by Mandarin (n=124, 32%), Japanese (n=57, 14.7%), and Korean (n=13, 3.4%). Faculty of Business and Management (n=188; 48.6%), Faculty of Science, Computer, and Mathematics (n=106; 27.4%), Faculty of Plantation and Agrotechnology (n=43; 11.1%), Faculty of Hotel and Management (n=36; 9.3%), Faculty of Communication and Media Studies (n=9; 2.3%), and Faculty of Accounting (n=5; 1.3%) had the most respondents. Overall, students from Jasin Campus (n=148; 38.2%), Bandaraya Melaka Campus (n=128; 33.1%), and Alor Gajah Campus (n=111, 28.7%) had the highest number of respondents. The age groups with the highest majorities were those between 20 and 21 (n = 191; 49.4%), 22 to 23 (n = 139; 35.9%), 18 to 19 (n = 45; 11.6%) at the Jasin Campus, and 24 to 25 (n = 12; 3.1%). As a result of the frequency analysis of the overall demographic background of the respondents, it can be claimed that the majority of the respondents were female, aged 20 to 21 years old, studying at the degree level at Jasin

Campus, from the Faculty of Business and Management. They selected Arabic as their third language, and they were now in level three.

Measurement Model
Under this section, the testing of the validity and reliability of the data will be performed. Three criteria are required in this section, namely convergent validity, discriminant validity and internal reliability of the research items (Ramayah et al., 2018). Convergent validity refers to the level to which several items can measure the same concept. This validity will be achieved when all AVE (average variance extracted) values exceed 0.50 and CR (composite reliability) exceeds the minimum level of 0.7 (Hair et al., 2011). The construct reliability or factors studied were tested using Cronbach's alpha and rhoA values. The minimum value required is 0.7 (Cronbach, 1951). The findings of this study have indicated that the minimum requirements for convergent validity, discriminant validity and reliability of the questionnaire items have been met. The results of the analysis are summarized in Table 1 below:

Table 1
Convergent Reliability Test

Construct	Item	Loading	Cronbach	rhoA	CR	AVE
Learning Metode	LM3	0.885	0.882	0.886	0.921	0.747
	LM4	0.938				
	LM5	0.906				
	LM7	0.709				
Lecturer Role	LR1	0.874	0.947	0.958	0.958	0.794
	LR2	0.726				
	LR3	0.939				
	LR4	0.950				
	LR5	0.912				
	LR6	0.928				
Student Performance	SP1	0.930	0.953	0.958	0.964	0.841
	SP2	0.946				
	SP3	0.921				
	SP4	0.899				
	SP5	0.889				

rhoA & CR: Composite Reliability, AVE: Average Variance Extracted
Source: Researchers (2022)

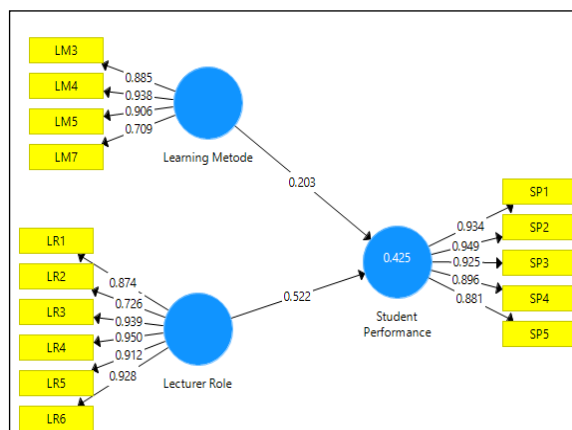The figure below demonstrates the reflective measurement:

Figure 3. Measurement Model

The discriminant validity was examined using the Heterotrait-Monotrait-HTMT method (Henseler et al., 2015). If the HTMT value is 0.90 or less than 0.90 (Gold et al., 2001), this indicates discriminant validity has been achieved. As described in Table 3, the discriminant validity between the study constructs was below the set value of 0.90. All values were obtained below the HTMT level of 0.90 (Gold et al., 2001) and this further indicates discriminant validity has been achieved.

Table 2
Ratio Heterotrait-Monotrait (HTMT)

	LM	LR	SP
LM			
LR	0.562		
SP	0.515	0.652	

LM: Learning Metode, LR: Lecturer Role, SP: Student Performance
Source: Researchers (2022)

Structural Model
This study was carried out to investigate the performance of UiTM Melaka students in learning Arabic through augmented reality. Two hypotheses were developed among the study variables to achieve this goal. To test the significance level and t-value for all path coefficients in the study model, the SmartPLS 3.0 bootstrapping function (Ringle et al., 2015) was used. The analysis revealed that, with the exception of the teaching strategies factor, a path coefficient, multimedia usage, was found to affect students' performance significantly at the level of 0.05 with a value of t 1.96.

Next, the quality of the research model was determined through the values of effect size (f2), R2 and Q2 (Hair et al., 2017). The analysis shows that the effect size (f2) has diverse values, from a small effect size (0.052) to a large effect size (0.345). In addition, the value of R2 is large at 0.425 while the value of Q2 which exceeds 0 (0.352) indicates that the study model has sufficient predictive relevance (Hair et al., 2017). Table 3 represents the analysis of the research hypothesis and quality models.

Table 3
Path Coefficient Test Results

Hypothesis	Correlation	Std. Beta	Std. Error	t-value	Result	R^2	f^2	Q^2
H1	LM -> SP	0.203	0.048	4.199**	Supported	0.425	0.345	0.352
H2	LR -> SP	0.522	0.046	11.346**	Supported		0.052	

LM: Learning Metode, LR: Lecturer Role, SP: Student Performance
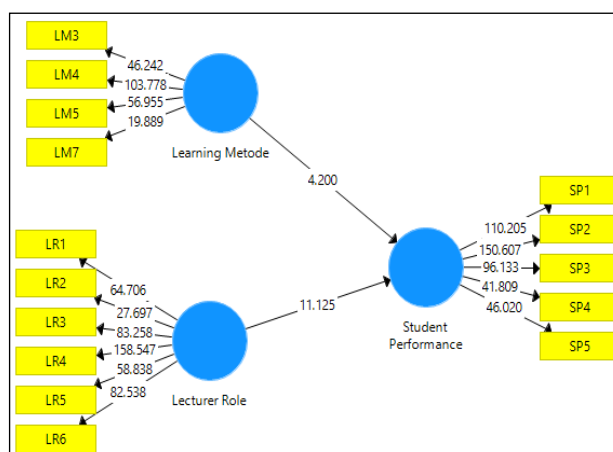***p<0.05, t-value is larger than 1.96*
Source: Researchers (2022)

Figure 4. Structural Model

Importance-Performance Matrix Analysis
In order to obtain the diagnostic value of the model, IPMA analysis was performed (Martilla & James, 1977). This evaluation is based on a comparison between the average value of student satisfaction (SS) with PLS expectation which calibrates the importance of each construct in the research model. In other words, through the analysis of IPMA, the significance and achievement of each factor that affects student performance will be identified.

Table 4
IPMA Analysis

Construct	Importance (Total Effect)	Performance (Index Value)
LM	0.203	51.233
LR	0.522	42.187
SP	-	56.140

Table 4 clearly shows that the most important factor is the Lecturer role factor (LR), with an importance value of 0.522 and a performance value of 42.187, followed by the Learning Metode (LM), with importance and performance values of 0.203 and 51.233, respectively. Both of these factors are thought to be more important than others. Using this IPMA analysis, lecturers should concentrate on these two aspects, particularly their roles, which have been found to be the most influential factor in influencing a student to achieve student performance.

Conclusions

The findings indicate that the use of AR technology in learning methods and lecturer roles improves student performance. In the learning method, using QR codes to learn Third Language through images, videos, audio, and text provides a more effective learning experience. The use of technology can also improve the ability of people to pay their bills on time. Making learning and teaching easier, more enjoyable, and more motivating for students to continue learning Third Language.

However, it also has an impact on how well students perform in the lecturer's role. Among them, lecturers frequently use AR technology to explain topics, provide reference materials, and encourage students. The study's findings indicate that lecturers are adept at incorporating augmented reality multimedia technology into third-language learning. Future research could concentrate on the creation of teaching aids by incorporating AR elements into other social science fields. This can improve students' academic achievement as well as their overall satisfaction.

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