

## Students' Readiness and Perceptions Towards Unity for Developing a Multimedia Interactive Package

Fairuz Husna Mohd Yusof<sup>1</sup>, Zulaikha Khairuddin<sup>2</sup>, Onaliza Satimin<sup>3\*</sup>  
Azrin Raimi Ahmad<sup>4</sup>, Khairunnisa Mohd Daud<sup>5</sup>, Salina Sabri<sup>6</sup>

<sup>1</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: fairu05@uitm.edu.my

<sup>2</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: zulaikha5497@uitm.edu.my

<sup>3</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: onaliza@uitm.edu.my

<sup>4</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: azrinraimi@uitm.edu.my

<sup>5</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: khai208@uitm.edu.my

<sup>6</sup>Academy of Language Studies, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia  
Email: salin619@uitm.edu.my

### ABSTRACT

#### CORRESPONDING

#### AUTHOR (\*):

Onaliza Satimin

(onaliza@uitm.edu.my)

#### KEYWORDS:

Multimedia interactive package

Language learning

e-learning

Unity

Development platform

Perceptions

Readiness

#### CITATION:

Fairuz Husna Mohd Yusof et al. (2024).  
Students' Readiness and Perceptions  
Towards Unity for Developing a Multimedia  
Interactive Package. *Malaysian Journal of  
Social Sciences and Humanities (MJSSH)*,  
9(10), e003035.  
<https://doi.org/10.47405/mjssh.v9i10.3035>

This study investigates students' readiness and perceptions towards using Unity, a development platform, for creating a Multimedia Interactive Package (MIP). With the growing demand for interactive digital content in education, it is crucial to understand students' readiness and perceptions in engaging with a platform like Unity in developing a language learning application in the form of MIP. The study examines language students' technology readiness as well as their perceptions towards integrating technology into educational content creation. A quantitative approach was employed using a survey to gather data using a set of questionnaires. The sample involved university language students who enrolled in multimedia development courses. Results indicate that while students generally show enthusiasm for using Unity, students faced challenges that may affect their learning experiences. However, the perceived benefits, including enhanced creativity, interactivity, and practical skill development, contribute to a positive overall attitude. The findings suggest that with adequate support and training, Unity can be a valuable tool for developing educational MIPs, promoting both student engagement and technical proficiency.

**Contribution/Originality:** This study contributes to the existing literature on language students' perceptions on using the Unity platform in developing multimedia interactive packages (MIP). Furthermore, this study also highlights the students' readiness in learning and developing the MIP.

## 1. Introduction

Traditional textbooks, despite its vital role in language education, often struggle to effectively capture students' interest due to their unchanging and linear format. The absence of interactivity and scarce multimedia resources may result in passive learning, lack of motivation and disengagement among learners. Consequently, in an era in which digital tools and interactive content are becoming common, learners may find it difficult to stay motivated and fully immersed in their studies (Pegrum et al., 2022).

The rapid advancement of technology has significantly affected educational practices, leading to adoption of digital tools and platforms in enhancing teaching and learning experiences. Some of the digital tools that are developed are learning applications that act as supporting materials for learners to understand the lessons better (Klimova & Zamborova, 2022). In learning language, it is important for learners to practise the language skills and having supporting materials would really benefit them (Aziz et al., 2024). The language learning applications usually provide a vibrant and interactive alternative that can better meet the diverse needs of learners, some can even provide personalised learning for the learners. These applications integrate audio, video, and interactive tasks to create an engaging learning experience that textbooks could not offer. In more advanced applications, the elements of Ai, gamification, adaptive learning techniques, and real-time feedback are provided.

Considering the downside of traditional textbooks, there is an urgent need to create and adopt language learning apps that provide a more engaging, personalised, and effective approach to language learning. Undergraduate students of Applied Language Studies who were taking multimedia courses were exposed to a development platform, Unity. Unity is a platform used to develop a language learning application called Multimedia Interactive Package (MIP). The students were expected to develop a fully functional MIP which comprises instructional content and practices, using the skills they had learned in class. While incorporating information and technologies into the curriculum is vital for maintaining the quality of education, it is also important to ensure that the students are prepared for it. Abaa et al. (2022) stated that in 2019, the United Nation Development Programme reported nearly 80% of students in developing countries believe they are not adequately equipped to use technology. Thus, this study would like to examine the students' readiness and perceptions in using Unity to develop the MIP.

### 1.1. Research Objectives

The objectives of the study are:

- i. To examine students' readiness towards using a development platform (Unity) for developing a multimedia interactive package
- ii. To determine students' perceptions towards using a development platform (Unity) for developing a multimedia interactive package

The research questions are:

- i. What is students' readiness towards using a development platform (Unity) for developing a multimedia interactive package?
- ii. What are students' perceptions towards using a development platform (Unity) for developing a multimedia interactive package?

## 2. Literature Review

### 2.1. Students' readiness towards technology

Students' readiness towards technology refers to the level of preparedness and ability of students to effectively engage with and utilise technology for learning and academic purposes (Geng et al., 2019; Alakrash & Razak, 2020). There are several key factors to consider in ensuring students' readiness, which include: i) digital literacy, ii) access to technology, and iii) psychological preparedness. After the world was hit with the Covid-19 pandemic, where remote learning was forced on all educational institutions, digital literacy became an important requirement for academic success (Udeogalanya, 2022). Furthermore, the new wave of industrial revolution has consequently caused the importance to transcend to the employability of an individual as employers are also placing a high value on this skill (Lestari & Santoso, 2019). This set of skills refers to basic technical skills (e.g., using computers, navigating the internet) as well as the ability to critically evaluate digital content, communicate online, and solve problems using technology. It is important to note that, in the academic setting, it includes the extent to which students can understand and use digital tools, software, and platforms for a more maximised learning (Riswanti et al., 2022).

Although digital literacy is key in ensuring students' readiness, access to technology could pose a challenge. Students coming from low socioeconomic backgrounds might not have their own gadgets, and factors such as students' location could limit access to the Internet (Jones & Smith, 2020; Khairuddin et al., 2020). It has therefore been suggested that should learning institutions, the government, telecommunication companies, and other stakeholders in education collaborate in working to offer and supply digital resources at cheaper prices, equitable access to technology would be achievable (Arthur-Nyarko et al., 2020; Dehghan et al., 2022). Additionally, another key factor to consider is students' psychological preparedness to technology-enhanced learning environments. Their motivation and attitudes toward using technology for learning must be managed well, not only by the students themselves, but also by the academicians (Ferrer et al., 2022). Empirical evidence has shown that maintaining a positive mindset influences students' academic performance, especially more so in a technology-driven educational environment (Limeri et al., 2020; Svenningsson et al., 2022; Yuan et al., 2022).

### 2.2. Students' Perceptions of Technology in Learning

In the context of technology and learning, perception refers to how students view, interpret, and understand the role and impact of technology in the educational process (Arar et al., 2023). The dependency on technology in learning, which reached its peak during the global Covid-19 pandemic, is a norm post-pandemic (Norman et al., 2023). As such, there has been a resurgence of interest in technology in the education system. One of the most highly used theories to measure how students come to accept use technology is Fred Davis' Technology Acceptance Model (TAM). TAM has been used to understand students' perceptions of technology and studies have shown that while technology in learning is perceived positively in the field of education, it also comes with negative perceptions. AlDakhil and AlFadda (2022) suggested that for language learners, technology can increase their autonomy, provide them with available sources, and become a useful learning tool. However, one learning application might not be able to cater to the various students' levels of English proficiency and learners might get

distracted during learning. [Zhang et al. \(2023\)](#) found that using technology in classrooms can bring a good learning experience for the students, and classrooms even became more cheerful. In spite of that, one of the drawbacks was that students reported that their eyes feel tired after a while. [Trespalacios and Lowenthal \(2019\)](#) reported that the positive attitudes learners have toward computers and internet self-efficacy influence their satisfaction with using technology in their learning; and [Plch \(2020\)](#) recommended that given today's generation of students, who are very much accustomed to social networks, academicians could integrate tools and environment that they are familiar with.

### 2.3. Students' Perceptions of Using Unity

The effectiveness of educational tools is significantly determined by the perceptions of the learners. The learners' perceptions on Unity as an educational tool to create multimedia interactive packages are dictated by a number of factors such as the ease of use, the relevance of Unity as the tool to achieve their learning goals and the perceived value of the skills they learn through the experience of using it.

A study conducted by [Dirican \(2015\)](#) found that learners are more likely to engage with Unity positively if they perceive it as a user-friendly and accessible tool. Thus, positive perception is important for the learners to have as it directly has an impact on the motivation and willingness to learn and further explore the platform ([Dirican, 2015](#)). Those who see the practicality of the usage of Unity in the actual situations, whether as a game development tool or educational content production, will definitely perceive Unity as a valuable platform and lead to higher engagement levels ([Hew & Cheung, 2008](#)). This perspective is also supported by a study conducted by [Akcaoglu et al. \(2022\)](#) that highlighted the platform's potency in improving student motivation and learning outcomes.

Research by [Islam \(2012\)](#) suggests that the relevance of Unity to learners' academic and career aspirations, as perceived by them, significantly impacts their attitudes towards using it. Those who acknowledge the potential of Unity will be more likely to spend more time and energy to learn and master the platform. This is in line with the findings in [Goldweber et al. \(2011\)](#) where students tend to show better engagement and satisfaction towards the tool that is aligned with their professional goals.

In general, students exhibit positive attitudes towards the use of Unity platform in education. According to [Yang \(2021\)](#) beginners find it easy to use and accessible due to its interface's user-friendliness and extensive resources. They are allowed to apply theoretical knowledge in practical scenarios more easily. These hands-on experiences offered by Unity were really appreciated by them ([Xia, 2014](#)). The ability to do collaborative projects that can promote teamwork and communication skills are also supported by Unity and these are highly valued in educational settings. According to [Loes and Pascarella \(2017\)](#), collaborative learning enhances critical thinking and academic performance significantly among university students.

### 2.4. The Role of Multimedia Interactive Packages (MIPs) in Education

Multimedia Interactive Packages (MIPs) have been proven to effectively improve student engagement. [Akinbadewa \(2020\)](#) proved in their study that the use of multimedia elements such as animations and interactive simulations can draw students'

focus and retain their motivation and lead to increased engagement. This is crucial for maintaining the motivation of the students and fostering active participation in the learning process (Akinbadewa, 2020).

The use of MIPs in education has proven to be effective to improve learning performance. Compared to traditional teaching methods, students that used MIPs exhibited better understanding and retention of sophisticated topics (Tang et al., 2023). The multimedia elements in the packages serve diverse learning styles and this will allow them to process knowledge in ways that are most effective for them. Plus, the immediate feedback provided by MIPs enables students to correct their mistakes promptly, thus improving their experience in learning the subject (Tang et al., 2023).

Educators can also benefit from using MIPs as it serves as a versatile tool that can be used as a supplement to traditional teaching methods, or it can also serve as an independent educational approach. According to a study by Xu and Patnao Jr. (2020), the use of MIP can foster critical thinking, problem-solving and independent learning skills which can facilitate learner-centered approach. MIPs is a flexible and adaptable teaching resource as it can be easily updated and tailored to meet the specific needs of different groups of students (Xu & Patnao Jr., 2020).

### 3. Research Methods

This study employed a quantitative approach with cross sectional research design. This research design was suitable to be employed as it may assist the researchers to collect data for many variables at one time and to investigate many outcomes from one study (Wang & Cheng, 2020). The instrument utilised in this study was a set of questionnaires to obtain the data and it was adopted and adapted to suit the context and the scope of this study. The questionnaire was adopted and adapted from Rahamat et al. (2011). There were three sections in the questionnaire. The first section was to obtain students' demographic information (semester and gender). The second and third sections focused on the two variables of the study which were students' readiness and students' perceptions. There were 20 items for the two sections and there were 10 items for each section. The values of Cronbach Alpha for the first construct, readiness was  $\alpha = .863$  and for second construct, perception was  $\alpha = .922$ .

As for the respondents, this study used multilevel sampling which were purposive sampling and simple random sampling. The purposive sampling was employed to select a specific population for the study and later simple random sampling was utilised within the population to give the same chance and opportunity to the respondents to be chosen (Noor et al., 2022; Stockemer & Bordeleau, 2023). As for the population, there were 250 students in the population and the responses that should be obtained by the researchers are 152 responses (Krejcie & Morgan, 1970). In addition, the students were selected based on certain criteria and the criteria were, the students should have learnt two courses which were EPC521 and EPC551 and they should have learnt and be able to develop a multimedia interactive package. However, there were not many respondents who responded to the questionnaire within one week, hence the researchers gave the respondents another one week to complete the questionnaire and the study only managed to obtain 86 responses. This suggests that the results of this study could not be generalised.

To collect the data, the researchers asked the respondents' consent by asking them to

click agree button in the questionnaire. This means once the respondents clicked the 'Agree' button, they were willing to participate in this study. Nevertheless, if they would like to withdraw from the study, there is no consequences towards the respondents. Next, the researchers contacted the class lecturers and class representatives for each batch which were students from Semester 3 and 4. The students were given one week to complete the questionnaire. After the data was collected, the researchers analysed the data using Statistical Package for Social Sciences (SPSS) version 29. The data was presented in the form of tables, and the results were depicted in percentage, mean and standard deviation.

## 4. Results

### 4.1. Demographic profile of the respondents

Among the 86 questionnaires collected, 10.5% of the respondents were male, and 89.5% were females. The majority of the respondents were in semester 4 (54.7%) and 45.3.9% of the respondents were in semester 3.

### 4.2. What is students' readiness towards using a development platform (Unity) for developing a multimedia interactive package?

#### 4.2.1. Technology skills rating

Respondents were asked to rate their technology skills on a scale from 1 to 5, where 1 = Poor, 2 = Bad, 3 = Moderate, 4 = Good, and 5 = Very Good. The mean score for technology skills was 3.5 (SD = 0.6088), indicating that on average, respondents rated their skills between moderate and good.

Table 1 shows that the majority of the respondents (48.8%) rated their technology skills as moderate. Additionally, 45.3% of the respondents rated their skills as good and 3.5% rated their skills as very good. A small percentage of 2.3% rated as bad while no respondents rated their skills as poor.

Table 1: Technology rating skills

No	Rating	Percentage
1	Poor	0%
2	Bad	2.3%
3	Moderate	48.8%
4	Good	45.3%
5	Very Good	3.5%

#### 4.2.2. Technology usage

Based on Table 2, the majority of the respondents (91.9%) used technology for photo editing, followed by 94.2% of the respondents who used it for video editing. Additionally, 88.4% of the respondents used technology for Internet surfing, and 86%

for video recording. Meanwhile, 47.7% of the respondents used the technology for sound recording, while 46.5% used technology for website development. Lastly, 37.2% of the respondents used technology for app development.

Table 2: Technology usage

No	Rating	Percentage
1	Photo editing	91.9%
2	Video editing	94.2%
3	Video recording	86%
4	Internet surfing	88.4%
5	Sound recording	47.7%
6	App development	37.2%
7	Website development	46.5%

#### 4.2.3. Readiness on learning platform

The survey results in [Table 3](#) provide insights into respondents' readiness regarding learning platforms, focusing on app development and familiarity with Unity. When asked about previous experience in developing learning apps, 47.7% of the respondents indicated they had created such an app before, while 52.3% had not. A significant majority, 75.6% of respondents, reported that they had heard of Unity before, while 24.4% were unfamiliar with it. When asked if they had used Unity before enrolling in the EPC521 and EPC551 classes, 47.7% answered yes, while 52.3% had no prior experience.

Table 3: Readiness on learning platform

No		Yes	No
1	Have you developed any learning app before?	47.7%	52.3%
2	Have you heard of Unity before?	75.6%	24.4%
3	Have you used Unity prior to EPC521 and EPC551 class?	47.7%	52.3%

#### 4.2.4. Students' Readiness to Use Unity for Developing MIP

[Table 4](#) presents the students' readiness to use Unity for developing MIP. The highest mean score, 3.8488 (SD = 0.84738), reflects a strong commitment to dedicating time to learning Unity for the purpose of developing MIP. The second highest mean score is 3.6860 (SD = 0.87126) which indicates that students are generally ready to collaborate with others, an essential aspect of project-based learning, especially in developing MIP. This is followed by students feeling fairly prepared to use Unity for MIP development (M = 3.6860, SD = 0.78608). Students mostly agreed that they have the necessary hardware, software, and Internet access to work with Unity (M = 6744, SD = 0.83232). While students are generally comfortable working with a new platform like Unity, their

comfort level is not particularly high with a mean score of 3.5930 (SD = .88621). Students expressed moderate confidence in their ability to learn Unity with a mean score of 3.5814 (SD = 0.88736) indicating variability, with some students feeling more assured than others. Additionally, the students also believe that they can integrate instructional system design (ISD) theory with Unity's technical features in developing MIP (M = 3.5349, SD = 0.90356). Lastly, students show moderate confidence in finding solutions to problems they may encounter when using Unity (M = 3.5116, SD = 0.85052). The overall mean score for students' readiness to use Unity for developing MIP is 3.6395 (SD = 0.68958).

Table 4: Students' Readiness to Use Unity for Developing MIP

No		Mean	SD
1	I feel confident in my ability to learn how to use Unity for developing MIP.	3.5814	.88736
2	I am ready to dedicate time to learning Unity for the purpose of developing MIP.	3.8488	.84738
3	I believe I can find solutions to problems encountered related to MIP development when using Unity.	3.5116	.85052
4	I am prepared to use Unity to develop an MIP.	3.6860	.78608
5	I am comfortable working with a new technology platform like Unity to develop MIP.	3.5930	.88621
6	I have the necessary resources (hardware, software, Internet access) to work using Unity.	3.6744	.83232
7	I feel ready to collaborate with others to develop MIP using Unity.	3.6860	.87126
8	I believe I can integrate instructional system design (ISD) theory with Unity's technical features in developing MIP.	3.5349	.90356
9	Overall	3.6395	.68958

### 4.3. What are students' perceptions towards using a development platform (Unity) for developing a multimedia interactive package?

Table 5 shows students' perceptions towards using Unity in developing MIP. The highest mean score, 4.0698 (SD = 0.62855), shows that students feel Unity provides the necessary tools and features to develop effective MIP. The second highest mean score is 4.0581 (SD = 0.72525), indicating that students recognise Unity's potential to create interactive experiences, which is crucial for language learning applications like MIP. The same mean score, with a standard deviation of 0.67484, reflects students' perception of Unity as an effective platform for developing MIP as it can create learning instructions and quizzes. Additionally, students appreciate Unity's ability to incorporate multimedia elements such as images, videos, sounds, and animations to enhance learning (M = 4.0465, SD = 0.71795). Students also believe that the skills they acquire from using Unity will benefit them in other areas of study or work, such as content presentation, video creation, and portfolio building (M = 4.0116, SD = .87440). Furthermore, students



mostly agree that Unity is an appropriate tool for developing MIP ( $M = 3.9651$ ,  $SD = 0.71039$ ). With a mean score of  $3.7791$  ( $SD = 0.83174$ ), students believe that developing MIP with Unity will enhance language learning outcomes. Meanwhile, the lowest mean score,  $3.5349$  ( $SD = 0.86646$ ), suggests that students generally agree that learning Unity will be worth their time and effort. The overall mean score for students' perceptions towards using Unity in developing MIP is  $3.9927$  ( $SD = 0.60977$ ).

Table 5: Students' Perceptions towards Using Unity in Developing MIP

No		Mean	SD
1	Unity is an appropriate tool for developing MIP.	3.9651	.71039
2	Developing MIP with Unity will enhance language learning outcomes/objectives.	3.7791	.83174
3	Using Unity to develop MIP can make language learning more engaging. (images/videos/sounds/ animations/ scroll view etc)	4.0465	.71795
4	Unity provides sufficient tools and features to effectively develop MIP.(images/videos/sounds/ animations/ scroll view etc)	4.0698	.62855
5	I believe that the skills learned while using Unity for MIP development will benefit me in other areas of study or work. (video presentation / content presentation/ resume / portfolio)	4.0116	.87440
6	Unity allows for the creation of interactive experiences that are important for language learning app like MIP.	4.0581	.72525
7	Unity is an effective platform for developing MIP as it can create learning instructions and quizzes.	4.0581	.67484
8	I think that learning Unity will be worth the time and effort for my future.	3.5349	.86646
9	Overall	3.9927	.60977

## 5. Discussions

### 5.1. What is students' readiness towards using a development platform (Unity) for developing a multimedia interactive package?

The results highlighted that students' readiness to use Unity for developing a multimedia interactive package (MIP) is diverse, with 47.7% of the respondents having experience in developing learning applications. This indicates that although almost half of the student body should be confident in using the platform in class, the other 52.3% of the students might encounter difficulties in approaching the Unity platform. However, despite the difference in percentage of those who are familiar with using Unity, a majority of 75.6% were aware of Unity, showing that this platform is widely recognised among them. Familiarity with a learning platform can enhance student engagement by reducing the cognitive load associated with simultaneously learning both the platform and the course content. As Müller and Wulf (2024) suggest, presenting too much

information at once can result in cognitive overload, hindering effective learning. However, it is important to note that without prior experience in using the platform before, students may have a higher level of anxiety in approaching the content, which then could lead to negative impact on their learning outcomes and performance in class.

The results also indicate that students demonstrate a strong commitment to dedicating time in learning Unity or the purpose of developing MIP, which is a positive indicator of learning engagement. In particular, mastering a complex platform like Unity requires consistent effort, and students' willingness to invest time is a positive indicator of their ability to succeed in learning environments that involve advanced technology (Reddy et al., 2023). The students also indicate their readiness to collaborate, which is an essential element in project-based learning, particularly when using new and complex platforms. Collaboration in technology-enhanced learning environments has been demonstrated to enhance problem-solving skills and increase learning efficiency (Bergdahl et al., 2020). In the context of Unity, which often requires multiple aspects of input in MIP development, teamwork is essential for managing the platform's complexity. This indicates that students' willingness to collaborate and work together to solve technical issues and challenges is an important factor in using Unity to develop their MIP successfully.

However, while students are generally comfortable with learning new platforms, their comfort level is not particularly high. This suggests that students may require additional support in dealing with new platforms like Unity, as the lack of familiarity can foster anxiety and low motivation which could then lead to limited engagement with the learning as a whole. The moderate confidence in solving problems when using Unity further indicates that while students are somewhat prepared to overcome issues, they may still face challenges. Students using new and complex learning platforms often benefit from structured guidance and step-by-step tutorials from the instructors to address technical challenges and help with problem-solving skills. This scaffolding technique is critical in reducing frustration and anxiety, as noted by Rossiter et al. (2024), highlighting the importance of providing students with targeted support to enhance their confidence in using unfamiliar technologies. In general, the respondents pose a positive readiness in using Unity as a learning platform though additional and specific support in the classroom is necessary to ensure that students can stay engaged in their learning and thus achieve all the learning outcomes.

## **5.2. What are students' perceptions towards using a development platform (Unity) for developing a multimedia interactive package?**

The findings highlighted that a majority of students felt that Unity provides the necessary tools and features to develop MIP effectively. This shows that students believe that the software that they are using will be able to help them achieve what is required for the task stipulated in the course, which is to develop an e-learning content in the form of a Multimedia Interactive Package (MIP). This is probably because Unity not only provides platforms for the development of learning instructions (instructional content) but also provides the platform for quizzes. As stated by Agbo et al. (2023), Unity has high compatibility with various devices and its great development environment makes it highly suitable for the integration of instructional content and assessment while providing interactive experiences.

Most students recognised Unity's potential to create interactive experiences and learning instructions and quizzes. In Unity, developers could materialise their design using interactive features provided such as buttons, scroll view, sliders, transitions of scenes etc. MIP learners may feel that they are able to control their own learning environment and pace, thus giving them better interactive experiences. Besides that, coding feature (in C# script) allows the developers to prompt the questions for the quizzes and set the relevant feedback based on the learners' answers respectively. As stated by [Yilmaz and Yilmaz \(2020\)](#), when learners are given tailored feedback, it will help learners improve their engagement and self-regulation, ultimately enhancing learning outcomes. In addition, Unity also allows for customisation and randomisation of questions in the form of multiple-choice questions, fill in the blanks, drag and drop/matching, word puzzles, crossword puzzles etc. This feature makes Unity a practical choice for integrating quizzes within educational applications ([Sapundzhi et al., 2023](#)). Since Unity allows multimedia elements such as images, videos, sounds, and animations to be integrated, it creates better opportunities for the MIP to be more interesting and engaging.

In regard to using Unity for developing MIP, most of them agreed that Unity is an appropriate tool for developing MIP and students believe that developing MIP with Unity will enhance language learning outcomes. This shows that Unity is a good choice of platform to be utilised in developing MIP considering its functions and usability among the users. As stated by [Sapundzhi et al. \(2023\)](#), Unity's built-in features, like the High Definition Render Pipeline (HDRP) and Universal Render Pipeline (URP), offer powerful rendering capabilities, making it suitable for creating visually engaging content, thus improving language learners' skills through the use of MIP. These attributes make Unity a strong choice for multimedia package development, ensuring both high functionality and ease of use for users. Overall, students' perception towards using Unity in developing MIP is positive. This is congruent to [Dirican \(2015\)](#) in which he found that learners are more likely to engage with Unity positively if it is perceived as a user-friendly and accessible tool.

## 6. Conclusion

Based on the issue discussed, students might face difficulties to stay motivated in language learning using traditional methods. Therefore, this study was conducted to get the students' insights of their readiness and perceptions of developing a platform (multimedia interactive package) for language learning. The majority of students were aware of the application (app) used to develop the MIP and less than 50% of students were familiar with the app. This means students need to be exposed to more of the app before they start using the app. This is because the familiarisation process is important to ensure students understand and know why they use the app and how to use the app in the development process. Hence, the instructors need to ensure that students were introduced to the apps earlier before they start using the app. Other than that, it can also be seen that students were moderately ready to develop MIP. This is maybe due to students not being confident with their ability to develop the MIP based on the requirements provided by the instructors. This means the instructors need to guide and assist students based on students' needs and based on this situation, students were not able to be independent during the development process of the MIP. From this result, it could be suggested for the instructors to provide more assistance, maybe by having peer guiding among the students where more advanced students could help and assist their

friends in developing the MIP. At the same time, this could increase students' engagement in the classroom.

In addition, based on the results gained, students perceived that the app used in the course was suitable for language learning as it integrates various multimedia elements and provides interactive features to be used in the development. The interactive features could lead to more engaging content which can help learners to have better understanding in learning the language. From these results, it is recommended for instructors to guide and students to include materials that can help users that use the MIP to learn the content better as MIP could be used remotely by the users anytime and anywhere that they users want. The suitable elements (interactive, engaging, colour choices) need to be considered in developing the MIP. The results indicate that students could be more ready in using Unity in developing the MIP if instructors exposed and familiarised them with the app earlier. Even though students were moderately ready to develop MIP, they perceived that using Unity to develop MIP is suitable and appropriate. To have in-depth students' insight on their readiness and perceptions, a qualitative approach could be utilised for future research by interviewing the students where qualitative data could be triangulated with quantitative data. Future researchers could also investigate students' perceptions before and after using the app (Unity) by conducting pre and post-tests. Thus, more stakeholders could benefit from the current and future research on the use of Unity in developing e-learning content. This study contributes to the existing literature on language students' perceptions on using the Unity platform in developing multimedia interactive package.

### **Ethics Approval and Consent to Participate**

The researchers went through the process of getting the research ethics approval by the Research Ethics Committee of Universiti Teknologi MARA Malaysia (REC). All procedures performed in this study involving human participants were conducted in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all participants.

### **Acknowledgement**

All authors have written parts in the journal and contributed fairly.

### **Funding**

This study received no funding.

### **Conflict of Interest**

The authors reported no conflicts of interest for this work and declare that there is no potential conflict of interest with respect to the research, authorship, or publication of this article.

## References

- Abaa, A. E., Aina, J. S., Akande, R. M., & Ogunjirin, T. M. (2022). An assessment of students' readiness for digital learning in senior secondary schools in Lagos state. *Pan-Commonwealth Forum 10 (PCF10)*. <https://doi.org/10.56059/pcf10.5882>
- Agbo, F.J., Oyelere, S.S., & Suhonen, J. (2023). Design, development, and evaluation of a virtual reality game-based application to support computational thinking. *Education Tech Research Dev*, 71(2), 505–537. <https://doi.org/10.1007/s11423-022-10161-5>
- Akcaoglu, M., Dogan, S., & Hodges, C. B. (2022). Real coding and real games: Design and development of a middle school curriculum using Unity 3D. *TechTrends*, 66, 931-937. <https://doi.org/10.1007/s11528-022-00782-1>
- Akinbadewa, B. O. (2020). The effect of multimedia instructional packages on students' academic achievement in biology. *International Online Journal of Education and Teaching*, 7(4), 1266-1281. <https://iojet.org/index.php/IOJET/article/view/880>
- Alakrash, H. M., & Razak, N. A. (2020). Towards the education 4.0, readiness level of EFL students in utilising technology-enhanced classroom. *International Journal of Innovation, Creativity and Change*, 13(10), 161-182. [https://www.ijicc.net/images/vol\\_13/Iss\\_10/131012\\_Alakrash\\_2020\\_E\\_R.pdf](https://www.ijicc.net/images/vol_13/Iss_10/131012_Alakrash_2020_E_R.pdf)
- AlDakhil, M., & AlFadda, H. (2022). EFL learners' perceptions regarding the use of Busuu application in language learning: Evaluating the technology acceptance model (TAM). *English Language Teaching*, 15(1), 1-15. <https://doi.org/10.5539/elt.v15n1p1>
- Arar, K., Saiti, A., & Guajardo, M. (2023). Redesigning and recomputing the future of education: The role of technology, the learning process, personality traits, and diversity in learning systems. *Power and Education*, 15(2), 243-258. <https://doi.org/10.1177/17577438221117346>
- Arthur-Nyarko, E., Agyei, D. D., & Armah, J. K. (2020). Digitizing distance learning materials: Measuring students' readiness and intended challenges. *Education and Information Technologies*, 25(4), 2987-3002. <https://doi.org/10.1007/s10639-019-10060-y>
- Aziz, M., Azizullah, A., & Baloch, S. (2024). Emerging trends and issues in English language teaching: A bibliometric analysis. *Journal of Asian Development Studies*, 13, 1004-1016. <https://doi.org/10.62345/jads.2024.13.1.83>
- Bergdahl, N., Nouri, J., & Fors, U. (2020). Disengagement, engagement and digital skills in technology-enhanced learning. *Education and information technologies*, 25(2), 957-983. <https://doi.org/10.1007/s10639-019-09998-w>
- Dehghan, H., Esmaeili, S. V., Paridokht, F., Javadzade, N., & Jalali, M. (2022). Assessing the students' readiness for e-Learning during the Covid-19 pandemic: A case study. *Heliyon*, 8(8), e10219. <https://doi.org/10.1016/j.heliyon.2022.e10219>
- Dirican, C. (2015). The impacts of robotics, artificial intelligence on business and economics. *Procedia-Social and Behavioral Sciences*, 195, 564-573. <https://doi.org/10.1016/j.sbspro.2015.06.134>
- Ferrer, J., Ringer, A., Saville, K., A Parris, M., & Kashi, K. (2022). Students' motivation and engagement in higher education: The importance of attitude to online learning. *Higher Education*, 83(2), 317-338. <https://doi.org/10.1007/s10734-020-00657-5>
- Geng, S., Law, K. M., & Niu, B. (2019). Investigating self-directed learning and technology readiness in blending learning environment. *International journal of educational technology in higher education*, 16(1), 1-22. <https://doi.org/10.1186/s41239-019-0147-0>

- Goldweber, M., Davoli, R., Little, J. C., Riedesel, C., Walker, H., & Von Kinsky, B. R. (2011). Enhancing the social issues components in our computing curriculum: Computing for the social good. *ACM Inroads*, 2(1), 64-82. <https://doi.org/10.1145/1929887.1929907>
- Hew, K. F., & Cheung, W. S. (2008). Attracting student participation in asynchronous online discussion: A case study of peer facilitation. *Computers & Education*, 51(3), 1112-1124. <https://doi.org/10.1016/j.compedu.2007.11.002>
- Islam, A. N. (2012, January). Understanding e-learning system usage outcomes in hybrid courses. In *2012 45th Hawaii International Conference on System Sciences* (pp. 118-127). IEEE. <https://doi.org/10.1109/HICSS.2012.613>
- Jones, R., & Smith, D. J. (2020). Technology to Enhance Learning for All Students: Accessibility Issues and Internet Access for Low SES. In *Leveraging Technology to Improve School Safety and Student Wellbeing* (pp. 33-46). IGI Global. <https://doi.org/10.4018/978-1-7998-1766-6.ch003>
- Khairuddin, Z., Arif, N. N. A. N. M., & Khairuddin, Z. (2020). Students' readiness on online distance learning (ODL). *Universal Journal of Educational Research*, 8(12), 7141-7150. <https://doi.org/10.13189/ujer.2020.081281>
- Klimova, B., & Zamborova, K. (2020). Use of mobile applications in developing reading comprehension in second language acquisition—A review study. *Education Sciences*, 10(12), 391. <https://doi.org/10.3390/educsci10120391>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement*, 30(3), 607-610. <https://doi.org/10.1177/001316447003000308>
- Lestari, S., & Santoso, A. (2019). The roles of digital literacy, technology literacy, and human literacy to encourage work readiness of accounting education students in the fourth industrial revolution era. *KnE Social Sciences*, 3(11), 513-527. <https://doi.org/10.18502/kss.v3i11.4031>
- Limeri, L. B., Carter, N. T., Choe, J., Harper, H. G., Martin, H. R., Benton, A., & Dolan, E. L. (2020). Growing a growth mindset: Characterizing how and why undergraduate students' mindsets change. *International Journal of STEM Education*, 7, 1-19. <https://doi.org/10.1186/s40594-020-00227-2>
- Loes, C. N., & Pascarella, E. T. (2017). Collaborative learning and critical thinking: Testing the link. *The Journal of Higher Education*, 88(5), 726-753. <https://doi.org/10.1080/00221546.2017.1291257>
- Müller, F. A., & Wulf, T. (2024). Differences in learning effectiveness across management learning environments: A cognitive load theory perspective. *Journal of Management Education*, 48(4), 802-828. <https://doi.org/10.1177/10525629231200206>
- Noor, S., Tajik, O., & Golzar, J. (2022). Simple random sampling. *International Journal of Education & Language Studies*, 1(2), 78-82. <https://doi.org/10.22034/ijels.2022.162982>
- Norman, A. A., Marzuki, A. H., Faith, F., Hamid, S., Ghani, N. A., Ravana, S. D., & Arshad, N. I. (2023). Technology dependency and impact during COVID-19: A systematic literature review and open challenges. *IEEE Access*, 11, 40741-40760. <https://doi.org/10.1109/ACCESS.2023.3250770>
- Pegrum, M., Hockly, N., & Dudeney, G. (2022). *Digital Literacies (Second Edition)*. Routledge. <https://doi.org/10.4324/9781003262541>
- Plch, L. (2020). Perception of technology-enhanced learning by medical students: An integrative review. *Medical science educator*, 30(4), 1707-1720. <https://doi.org/10.1007/s40670-020-01040-w>

- Rahamat, R. B., Shah, P. M., Din, R. B., & Abd Aziz, J. B. (2011). Students' readiness and perceptions towards using mobile technologies for learning the English language literature component. *The English Teacher*, 40(1), 69-84. <https://meltajournals.com/index.php/TET/article/view/132/127>
- Reddy, E. V., Reddy, P., Sharma, B., Reddy, K., & Khan, M. G. (2023). Readiness and perception of pacific students to mobile phones for higher education. *Technology, Knowledge and Learning*, 28(3), 1113-1132. <https://doi.org/10.1007/s10758-022-09595-w>
- Riswanti, R. R., Mujiyati, M., Ismu, S., & Hasan, H. (2022). The effect of self-directed learning on students' digital literacy levels in online learning. *International Journal of Instruction*, 15(3), 229-341. [http://repository.lppm.unila.ac.id/41420/1/iji\\_2022\\_3\\_18\\_%285%29.pdf](http://repository.lppm.unila.ac.id/41420/1/iji_2022_3_18_%285%29.pdf)
- Rossiter, E., Thomson, T. J., & Fitzgerald, R. (2024). Supporting university students' learning across time and space: a from-scratch, personalised and mobile-friendly approach. *Interactive Technology and Smart Education*, 21(1), 108-130. <https://doi.org/10.1108/ITSE-07-2022-0082>
- Sapundzhi, F., Kitanov, A., Lazarova, M., & Georgiev, S. (2023, July). Mobile Game Development Using Unity Engine. In *International Conference in Methodologies and intelligent Systems for Technology Enhanced Learning* (pp. 129-138). Cham: Springer Nature Switzerland. [https://doi.org/10.1007/978-3-031-42134-1\\_13](https://doi.org/10.1007/978-3-031-42134-1_13)
- Stockemer, D., & Bordeleau, J. N. (2023). *Quantitative methods for the social sciences: A practical introduction with examples in R*. Springer International Publishing. <https://doi.org/10.1007/978-3-031-34583-8>
- Svenningsson, J., Höst, G., Hultén, M., & Hallström, J. (2022). Students' attitudes toward technology: Exploring the relationship among affective, cognitive and behavioral components of the attitude construct. *International Journal of Technology and Design Education*, 32(3), 1531-1551. <https://doi.org/10.1007/s10798-021-09657-7>
- Tang, X., Zainal, S. R. B. M., & Li, Q. (2023). Multimedia use and its impact on the effectiveness of educators: a technology acceptance model perspective. *Humanities and Social Sciences Communications*, 10(1), 1-11. <https://doi.org/10.1057/s41599-023-02458-4>
- Trespalacios, J., & Lowenthal, P. (2019). What do they really like? An investigation of students' perceptions of their coursework in a fully online educational technology program. *Australasian Journal of Educational Technology*, 35(5), 60-78. <https://doi.org/10.14742/ajet.4364>
- Udeogalanya, V. (2022). Aligning digital literacy and student academic success: Lessons learned from COVID-19 pandemic. *International Journal of Higher Education Management*, 8(2), 54-65. [https://www.ijhem.com/cdn/article\\_file/2022-02-28-21-34-18-PM.pdf](https://www.ijhem.com/cdn/article_file/2022-02-28-21-34-18-PM.pdf)
- Wang, X., & Cheng, Z. (2020). Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, 158(1), S65-S71. <https://doi.org/10.1016/j.chest.2020.03.012>
- Xia, P. (2014). *3D Game Development with Unity: A Case Study: A First-Person Shooter (FPS) Game* [Bachelor Degree's thesis, Helsinki Metropolia University of Applied Sciences]. [https://www.theseus.fi/bitstream/handle/10024/71525/Xia\\_Peng.pdf?sequence=1](https://www.theseus.fi/bitstream/handle/10024/71525/Xia_Peng.pdf?sequence=1)
- Xu, P., & Patnao Jr, J. L. (2020). Exploring the impact of interactive multimedia elements on the effectiveness of online teaching in higher education: A quality evaluation

- perspective. *International Journal of Scientific and Engineering Applications (IJSEA)*, 12(12), 100-112. <https://doi.org/10.7753/IJSEA1212.1002>
- Yang, X. (2021). Students' and teachers' perceptions of using video games in science classroom: A Literature Review. *SN Computer Science*, 2(5), 411. <https://doi.org/10.1007/s42979-021-00803-5>
- Yilmaz, F. G. K., & Yilmaz, R. (2020). Learning analytics as a metacognitive tool to influence learner transactional distance and motivation in online learning environments. *Innovations in Education and Teaching International*, 58, 1-11. <https://doi.org/10.1080/14703297.2020.1794928>.
- Yuan, X., Kaewsang-On, R., Jin, S., Anuar, M. M., Shaikh, J. M., & Mehmood, S. (2022). Time lagged investigation of entrepreneurship school innovation climate and students' motivational outcomes: Moderating role of students' attitude toward technology. *Frontiers in Psychology*, 13, 979562. <https://doi.org/10.3389/fpsyg.2022.979562>
- Zhang, H., Yu, L., Ji, M., Cui, Y., Liu, D., Li, Y., & Wang, Y. (2023). Investigating high school students' perceptions and presences under VR learning environment. In *Cross Reality (XR) and Immersive Learning Environments (ILEs) in Education* (pp. 97-117). Routledge. <https://doi.org/10.1080/10494820.2019.1709211>