



## Online Learning Makes Student Perform Better: A Quantitative Study of Interactivity During Class and Academic Performance Among USIM Students

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### ABSTRACT

The purpose of this article is to investigate the effect of interactivity in online learning on student academic performance. Online learning has become a popular method of education, but the lack of interaction in some online courses has been a concern. This study aims to explore perception of interactivity in online learning can be enhanced to improve student academic performance. The research was conducted using a quantitative method, with a sample of 100 students enrolled in online courses at a university. Data was collected through a survey, which measured student's perceptions of interactivity in their online courses and their academic performance. The results of the study showed that there is a positive correlation between interactivity in online learning and student academic performance. The findings suggest that incorporating interactive elements, such as discussion boards, collaborative projects, and real-time interactions, can improve student engagement and ultimately lead to better academic outcomes. This research contributes to the understanding of how interactivity in online learning can be used to enhance student academic performance and can serve as a reference for educators and instructional designers in developing interactive online courses.

**Keywords:** *Online learning, Student performance, Interactivity during class, Academic performance, USIM students*

## INTRODUCTION

Technology has altered how we do our jobs, and it is also set to transform how we learn. In the corporate sector, online learning platforms has emerged as the most efficient method, especially when conferences are held for workforce from the same or different organisations. Nowadays, schools that implemented together the usage of e-learning technologies in teaching and learning activities are in a better position than those who only use conventional teaching method (Al Rawashdeh 2021; Mohd Basar et al., 2021). Without a doubt, it is crucial to expand the idea of non-electronic learning using lectures and books, but it is impossible to ignore the importance and efficiency of technology-based learning. Since it is believed that the human mind can remember and respond to what is shown and heard in animated pictures or videos (Korte, 2022), this research is particularly important. It has been shown that visuals not only keep student's attention, but also keep it for long periods of time in the brain. Therefore, the current study explores the online learning of faculty students regarding the academic performance, advantages, limitations, and recommendations for online learning among USIM student.

Online learning is defined as "learning experiences in synchronous or asynchronous environments using different devices (e.g., mobile phones, laptops, etc.) with internet access and in these environments, students can be anywhere (independent) to learn and interact with instructors and other students" (Singh & Thurman, 2019). The synchronous learning environment is structured in the sense that students attend live lectures, there are real-time interactions between educators and learners, and there is a possibility of instant feedback, whereas asynchronous learning environments are not properly structured. Littlefield (2018), suggest that, in such a learning environment, learning content is not available in the form of live lectures or classes; it is available at different learning systems and forums. Instant feedback and immediate response are not possible under such an environment.

There are most famous prominent interactive online tools: DingTalk (interactive online platform designed by Alibaba Group), Hangouts Meet (video calls tool), Teams (chat, interactive meetings, video, and audio calls), Skype (video and audio calls), WeChat 3 Work (video sharing and calls designed for the Chinese), WhatsApp (video and audio calls, chat, and content share), and Zoom (video and audio calls, and collaboration features).

In online classes, engagement is essential for student learning and happiness. For decades, literature on distant and online learning has investigated the meaning of involvement in detail. According to Newmann et al. (1992), student engagement is defined as "the student's psychological investment in and effort directed toward learning, understanding, or mastering the knowledge, skills, or crafts that academic work is intended to promote". Meanwhile, student's engagement in online learning ac-

According to Hollister et al, (2022), is the combination of classroom environment and technology. The influential characteristics of these two components are access to understanding technology, usability, design, technology choice, sense of community, and types of assessment measures. Because online learners appear to have less opportunities to engage with the institution, student involvement in e-learning is crucial. Therefore, it is crucial to develop a variety of online engagement options for students.

The most common way to measure the effectiveness of teaching is to measure student achievement. In general, weighted grade point average (GPA), graduation grade, as well as participation and employment placement are used in the determination of student achievement. Studies have indicated that these two online learning elements that are associated with students' online academic performance. Hatlevik et al. (2018), suggested that "computer and Internet self-efficacy" concerns students' confidence with computer and Internet use. According to a previous study by Tsai and Lin (2004), being comfortable utilising Microsoft Office programs or the Internet for research promotes online problem solving, reduces technology-related stress, and enhances academic achievement.

This study will examine on interactivity in online learning can affect USIM student's academic performance. Online learning has been promoted as being more cost effective and convenient than traditional educational environments as well as providing opportunities for more learners to continue their educations. The problem in this study is that there is less reference in the past research where the previous research has investigated regarding to the student's perception and satisfaction toward online learning and face-to-face learning. Fortune et al. (2011), studied that at a multicultural university in the United States, 156 students who took the Tourism and Recreation course and registered in either the online learning part or the face-to-face learning. Between individuals enrolled in the two various learning techniques, they discovered no statistically significant variation in learning preferences.

Study by Kemp and Grieve (2014), found that a result showed that undergraduate Psychology students at Australian university preferred to complete activities face-to-face rather than online. Students choose to complete written assignments online but participate in discussions in-person. Hollister et al. (2022), in his research on 187 undergraduate students, Covid-19 resulted in nearly all universities switching courses to online formats. Majority of students reported that they struggled with staying connected to their peers and instructors and managing the pace of coursework. However, majorities of students felt more comfortable asking and answering questions in online classes, suggesting that there might be features of learning online to which students are receptive towards willingness to listen to and accept new ideas and suggestions through online learning platforms.

This research applied the Outcome Interactivity Theory (OIT) proposed by Gleason (2009). According to OIT, interactivity is a communication event that results from the effective fusion of three predictive factors: the actual availability of interactive advanced advancements, the existence of similarly responsive content elements, and pertinent user experiences that enable the user to recognise and make use of these interactive features within the communication encounter to achieve the desired outcome. Context and user perception are the two contributing subdimensions that make up the user experiences dimension. As the Figure 1 show, the interactivity refers to the extent to which each user's experiences are made possible by the interactive features of the technology and information that collectively contribute to a successful communication event.

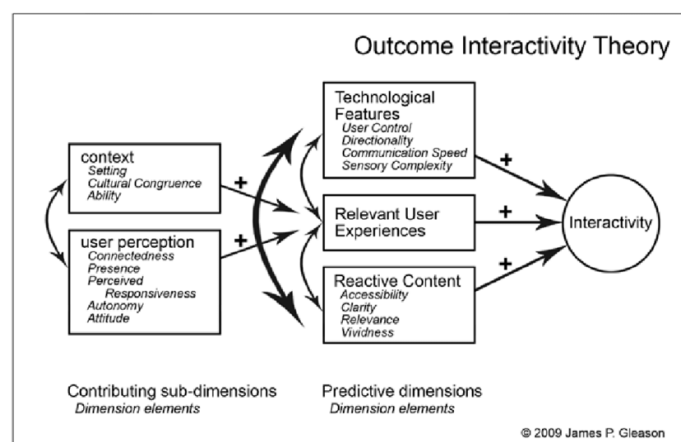


Figure 1: Theoretical Model of Outcome Interactivity Theory

## LITERATURE REVIEW

### Student engagement in online learning

Online learning is based on relatively new methods, such as content presentation through the Internet, and it emphasizes digital communication and digital learning resources. Moreover, student engagement is traditionally associated with face-to-face classroom learning. Study by Miao et al. (2020); Yin (2018), told that, student engagement in online learning is a recent research area and thus requires more study. In all educational levels, online learning has grown significantly since the disease outbreak spread in 2020. Even without prior training in online learning modalities, teachers began providing classes utilising online platforms. Teachers had to continue teaching remotely to reach learners who were taken part at home.

Online learning offers several potential benefits, including the flexibility of time, place, and, more importantly, pace. Martin and Bolliger (2018), in study portrayed an example, a lecturer managing an online asynchronous discourse has the probable to cultivate learners' critical thinking reflection and critical thinking, which enhances

their comprehension of the subject. Stec et al. (2020), portrayed other examples of virtual interaction strategies include presenting learning activities associated to conversation, effective listening, knowledge discovery and cooperation, and tasks that demand active participation from learners.

### **Role of motivation on engagement**

Even though online learning is being used all over the world throughout the outbreak, some studies show that it is not as successful as face-to-face learning at increasing engagement and motivation. As a result, it is considered essential to understand the influence of desire on engagement to understand digital learning and develop better e-Learning experiences during the pandemic.

There are several references to the relation between motivation and engagement, and the findings by Ben-Eliyahu et al. (2018) largely confirmed that positive engagement behaviours result from positive motivation. Moreover, Chaw and Tang (2019) reported that adverse motivation give rise to unfavourable interaction behaviours in learners.

### **The effectiveness of e-learning approach**

Instructors have always stated doubt on the likelihood of achieving results via online distance learning that are commensurate to that from conventional person-to-person session. According to Anderson (2013), study which contrasted the results of online and hybrid programs, retention and academic performance were poorer for students enrolled in remote course than they were for those taking courses in conventional learning environments. This relative ineffectiveness is attributed to a lack of interaction between instructor, students, as well companions in the e-learning setting (Rodriguez-Ardura & Meseguer-Artola, 2016).

In a study published by Wang, Zhang and Chen (2021) investigated variables associated with self-efficacy, monitoring, willpower, attitude, motivation, strategy, and the e-learning effectiveness of college students in the context of online education. The researcher points out that numerous studies have shown that online learning initiatives provide results where online technologies in the learning and teaching process offer important implications for online learning effectiveness. According to Kintu et al. (2017), research on hybrid instruction shows that students achieve results that are on par with, if not better than, those from other teaching modalities. Particularly, hybrid programme participants frequently outperform students enrolled in fully online programmes in terms of academic accomplishment.

The current debate in the literature indicates that it is challenging to draw broad conclusions regarding the effectiveness of distance learning, not least since it significantly differs from traditional classroom education in terms of learning style. Therefore, it may be preferable to focus more intently on issues like the relative benefits

and difficulties of switching to a virtual learning environment, the prerequisites for a successful implementation, and how this transition affects students of various capacities.

### **Concerns regarding online learning and teaching**

There are many innovations available for virtual education, but they can occasionally cause significant problems. These challenges and issues with modern technology include things like download errors, installation problems, login issues, audio, and video issues, and more. Online instruction can occasionally be boring and uninteresting for students. Students never find the time to participate in online learning because it requires so much flexibility and time. A major problem with online learning is the lack of individualized attention. Students want two-way communication, which can be challenging to implement. Students need to put what they learn into practice for the learning process to be as effective as possible. Online content can occasionally be entirely theoretical, making it difficult for students to practice and learn.

Another serious problem is the challenges of online education. According to Gheshlagh et al. (2022); Barrot et al. (2021); Mahyob (2020), learner acknowledge that the main obstacles from online education are absence from the society, technical difficulties, and a challenge in make sense of the objectives the course. In a study, it was discovered that students were not adequately prepared for juggling their study lives with their work, household, and social lives in a virtual learning environment. According to Wong et al. (2019); Yilmaz (2017), learner was discovered to be unready for a number of academic styles together with online learning competencies. Additionally, there is a lack from the learner readiness in term utilisation of learning management software.

### **Potential fixes for issues**

Although there are many drawbacks to online learning, we cannot discount its advantages in a situation like this. To overcome these challenges, we can always find solutions. By pre-recorded video lectures, experimenting the material, and always having a plan ready, technical issues can be resolved without affecting the teaching learning process. Online courses ought to be made engaging, interactive, and 17 dynamic. To encourage students to be alert and focused, teachers should give them time limits and reminders. To the greatest extent possible, attempts should be made to humanise the learning process. Students should receive individualised attention so they can easily adjust to this educational environment. Educators an communicate with students using social media and a variety of group forums. When it becomes challenging to communicate with students via texts, different video calls, messaging apps and other means, communication is the key; content should be such that students can practise and improve their skills.

Continuous course quality improvement and best effort teaching are both required. E-learning ought to be developed as it were. For example, innovative, engaging, pertinent, student-centred, and group-based. Making efficient strategies for delivering online instruction requires a lot of time from educators. Effective online instructions encourage feedback from students, encourage them to ask questions, and expand their knowledge of the course material. Institutions must concentrate on prioritise project-based learning, collaborative learning, and case learning through online lessons. Finding new technology and implementing it in educational institutions is a challenge, but so is reimagining education to support students and teaching staff who are looking for assistance with digital literacy.

## RESEARCH METHODOLOGY

Quantitative methods, like questionnaires, are used. These methods look at the user experience relevancy, technological feature, and academic performance. The goal of quantitative research is to find and change the independent variable to see how it affects the dependent variable (Rudestam & Newton, 2015; Stein & Reading, 2014). The quantitative method was suitable for this study and was used to collect data. Questionnaires were chosen as a way for the researcher to gather information. The people who answered the survey were answered conveniently from a sample of students at the Universiti Sains Islam Malaysia (USIM). Then, the results were looked at using SPSS software. This included a reliability analysis, a descriptive analysis, and a correlation test, all of which helped answer the research questions.

The location of the study was at Universiti Sains Islam Malaysia (USIM) in Negeri Sembilan, Malaysia. The study was mostly conducted online and targeted only the USIM students in the collection of data. This place aided researchers in conducting research by collecting data from respondents via questionnaires. The study's site was selected since USIM students are only stationed there and they make up most of the researcher target.

This study employs a quantitative approach. Researchers indicate scope of the study needs at least 100 respondents comprises of USIM students, which means students are on average of 18 to 25 years old with prior experience in the online learning environments. The goal of this research is to study User Experience Relevancy and Technological Feature towards Academic Performance. The researcher utilizes simple random sampling methods and sends out survey questionnaires to USIM students. The population of the research is taken to undergraduate students from year 1 to year 4. The results of this survey can be depicted in the form of numbers to predict the results of the research. This method ensures that the sample is representative of the population and that the results of any analysis performed on the sample can be generalized to the population.

The research paper tools are used through user-friendly online survey forms that are accessible to respondents. Other than that, it is timesaving and could achieve the research objective. The questionnaire consists of 17 questions and divided into 3 sections. Section A is about Demographic Data, which collects the respondent's profile and details such as gender, age, and years of study at USIM. This section's goal is to identify and analyze the respondent's background. Then, for section B, respondent will need to answer the relevant user experience by answering the Yes or No statement. After that, section C and D, researcher will use a five-point Likert scale, such as 1 (strongly disagree) to 5 (strongly agree). These instruments also used a Microsoft form survey questionnaire to determine interactivity and student academic performance during online class.

In SPSS, Cronbach's alpha is the indicator of reliability scale. In most social science research circumstances, a reliability coefficient of .60 or higher is deemed "appropriate." The table shows the interactivity during class and academic performance among USIM students by .967 instead of .60. Therefore, this item can be used in this research.

The Statistical Package for Social Sciences (SPSS) version 22 for Windows will be used to analyze the survey replies after they have been entered into a computer. Descriptive and reliability analyses will be used in this investigation. To respond to the research question and complete the study's goals, this study will use exploratory factor analysis and Pearson correlation analysis.

## **FINDINGS AND DISCUSSIONS**

In this article, the data have been analysed and the four main section in the questionnaire have been discussed. The four main sections are the demographic information of respondents, user experience relevancy, technological features, and academic performance. The reliability analysis for both pilot studies acceptable level of reliability value. The respondents mostly agreed that user experience relevancy and technological feature is affecting student academic performance. Overall, the study aims to evaluate the relationship between user experience relevancy and technological features toward student academic performance. The study found that all the hypotheses are supported where there are significant differences between technological features towards user experience relevancy and academic performance.



## Correlation analysis

Table 1 below shows the results of Pearson Correlation of two relationships between User Experience Relevancy and Technological Feature towards Academic Performance. Based on the Table 1, all the relationships between technological features and interactivity showing good relationship and strong significance.

		User experience relevancy	Technological Features	Academic Performance
Pearson correlation	Correlation Coefficient	1	.445	.978
	Sig. (2-tailed)	.000	.000	.000
	N	100	100	100

Table 1: Data Analysis on Pearson Correlation

## User Experience Relevancy

The result obtain from User Experience Relevancy is described here. The highest mean of User Experience Relevancy is from item number 1 "I am very competent in using digital technology tools" with the ( $\mu=3.36$ ,  $\sigma=1.18$ ), which has a high central tendency level of the range. Item number 4 and 5 gain the lowest mean ( $\mu=3.18$ ,  $\sigma=1.38$ ): "I spend a lot of time to exploring online learning platform." and "I find the software updates in online platform sometimes very frustrating". Researcher can conclude that student is able to access course materials, communicate with instructors and classmates, and complete assignments and assessments remotely. This can be especially beneficial for students who are unable to attend traditional in-person classes, such as those who live in remote areas or have scheduling conflicts. Additionally, online learning environments can also provide opportunities for students to learn at their own pace and on their own schedule, which can be beneficial for some students.

## Technological Features

The result obtains from Means of Technological Features. The highest mean of technological features is from item number 5 "Additional features on online learning platform such as glossaries, dictionaries, FAQs, and others help in understanding the platform well." with the ( $\mu=3.98$ ,  $\sigma=1.00$ ), which has a high central tendency level of the range. Item number 2 gain the lowest mean ( $\mu=2.87$ ,  $\sigma=1.24$ ): "The technological features on online learning platform made me feel in control." Researcher can see that student have a digital literacy utilizing online learning technology feature. For instance, variety of multimedia content. Online learning environments often include a variety of multimedia content, such as videos, audio recordings, and interactive activities, which can help to engage students and make learning more interactive.

### **Academic Performance**

The result of the Means of Academic Performance. The highest mean of academic performance is from item number 1 "The knowledge that I have gained during online class is more impactful compared to conventional session." with the ( $\mu=3.20$ ,  $\sigma=1.34$ ), which has a high central tendency level of the range. Item number 2 gain the lowest mean ( $\mu=3.01$ ,  $\sigma=1.34$ ): "I have met my learning expectations during online class session." Researcher can sum up that online learning on academic performance can vary depending on the student and the specific online learning environment. In general, past studies has shown that online learning can be as effective as traditional in-person instruction for some students, but it also can be less effective than traditional instruction for certain students.

Some factor that may impact the effectiveness of online learning such as the student's level of motivation and self-discipline and the quality of the online learning environment, including the availability of resources and support.

### **CONCLUSIONS AND SUGGESTIONS**

The user experience is a crucial aspect of online learning, as it can greatly impact a student's engagement, motivation, and overall satisfaction with the online class. A positive user experience can make online learning more effective, while a negative user experience can lead to disengagement and frustration. One key aspect of a positive user experience in online learning is ease of navigation. This means that the platform should be easy to use and understand, and that students should be able to find what they need quickly and easily.

Another important aspect of user experience in online learning is the level of interactivity and engagement. Interactive elements such as quizzes, discussions, and group projects can help students feel more connected to the material and to their peers. Additionally, the use of multimedia such as videos and images can make the learning experience more engaging and help students to better understand the material. In conclusion, a positive user experience is crucial for online learning to be effective. A user-friendly interface, interactivity, engagement, and personalization are all key aspects of a positive user experience in online learning. These elements can help to increase student engagement and motivation, leading to a more effective and satisfying learning experience.

There is a significant point in this research where respondents' they strongly agree toward technological feature on online learning platform. For instance, there are a platform like Learning Management Systems (LMS). These platforms allow educators to create, manage, and deliver online content to students. They also provide tools for tracking student progress and engagement. However, researcher should be aware of

some respondent belief that online learning is lack of structure and accountability. In online classes, students may have more freedom to complete assignments on their own schedule, but this can also make it harder for them to stay on track and meet deadlines.

Bird et al. (2022); Selvaraj et al. (2021) discussed on students in online classes may perform worse than those in traditional classes. This may be due to a lack of structure and accountability in online classes, as well as the lack of face-to-face interaction with instructors and classmates. On the other hand, other studies have found that online learning can be just as effective as in-person classes, and in some cases, even better. Online classes can provide students with the flexibility they need to balance their other responsibilities, and they allow students to learn at their own pace.

Additionally, online classes can provide students with access to educational resources and classes that may not be available in their local area. Overall, the academic performance of students in online classes may depend on individual factors such as their learning style, motivation, and discipline. It's important to note that online learning is not a one-size-fits-all solution, and it's not for every student. It's important for students to carefully consider their own needs and learning styles before deciding whether to take classes online. In conclusion, research on student academic performance in online learning is mixed, but it's important to note that online learning can provide students with flexible and convenient learning opportunities. It's important for student to consider their own learning style, motivation, and discipline before deciding whether to take classes online.

Researchers in this study concluded that this is a topic worth investigating since it has been a prevalent phenomenon and will continue to become more widespread in the future. Here are a couple of ideas: More research should be conducted to explore into to whole education level in online learning especially in primary school and secondary school, to fill the current gap in the literature. After that, researcher may need propose study on personalised learning. More research is needed to understand how to personalise online learning to meet the unique needs of individual students. This could include studies on how to adapt online materials to different learning styles, or how to use data and analytics to personalize instruction.

The utilisation on Virtual Reality and Augmented Reality could be recommended for the future study. As technology continues to evolve, virtual reality (VR) and augmented reality (AR) are becoming more prevalent in online learning. More research is needed to understand how these technologies can be effectively integrated into online learning environments and how they impact student engagement and learning outcomes. Usage of a qualitative could be recommended for further study. Because they provide greater flexibility in research design and combine the generation of theories and the testing of hypotheses within a single study is unusual for sepa-

rate qualitative or quantitative studies. Other theories should be tested to explain and predict field phenomena or predict the framework of the data and the expected potential for a relationship.

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