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(IJMOE)**www.gaexcellence.com/ijmoe**THE IMPACT OF ONLINE LEARNING AMONG
UNIVERSITY STUDENTS**

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Abstract:

Online learning has become an important mode of delivery in higher education. The COVID-19 pandemic accelerated the shift toward flexible digital platforms that present unique implementation challenges. This study examines the key factors affecting the impact of online learning experience among diploma students at Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM) Machang, Kelantan. The study focuses on student behaviour, lack of communication, and lack of technology as independent variables influencing the online learning experience among diploma students. A quantitative method was used to distribute a questionnaire among diploma students at Universiti Teknologi MARA (UiTM). A total of 98 respondents were analysed using Multiple Linear Regression. Results show that lack of communication ($B = 0.301$, $p = 0.002$) most significantly influenced the online learning experience ($R^2 = 0.446$), followed by lack of technology ($B = 0.289$, $p < 0.001$) and student behaviour ($B = 0.177$, $p = 0.018$). An $R^2 = 0.446$ means that 44.6% of the variance in the online learning experience is explained by lack of communication, lack of technology, and student behaviour. The findings conclude that the effectiveness of the online learning experience depends not only on digital platforms but also on

technological infrastructure and human factors, particularly communication and student behaviour.

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Keyword:

Higher Education, Lack of Communication, Lack of Technology, Multiple Linear Regression, Online Learning Experience, Student Behaviour



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Introduction

The advancement of technology has shaped the rapid evolution of online learning in higher education globally, especially during the unexpected COVID-19 pandemic. The phenomenon urged education systems to adopt online learning due to the movement control order (MCO) in early 2020. The adoption of online learning continues in the post COVID-19 era as a complementary support to traditional face-to-face learning. Universiti Teknologi MARA (UiTM) is one of the institutions that has embedded online learning as one of the teaching delivery methods since the establishment of the e-Learning Centre (i-LEC) in December 2005 (Hasrol Jono et al., 2009). However, since UiTM is the largest public university in Malaysia where the population of students comes from various diversity of socio-economic and demographic backgrounds, the impact of the online learning experience is a crucial issue that needs to be analysed and examined.

UiTM has introduced Online Distance Learning (ODL) following the MCO that enforced full-scale changes in the delivery method, shifting the existing learning to remote learning. Online platforms such as Google Meet, Microsoft Teams, Massive Open Online Courses (MOOCs), and Learning Management Systems (LMSs) have become alternatives for teaching and learning media for UiTM students across Malaysia (Ali & Andin Salamat, 2021). The online learning at UiTM that was originally implemented as the alternative plan was retained after the return of physical classes and has become the strategic focus of instructional delivery by launching hybrid models. The model introduced combines online and face-to-face classes that offer more flexibility to students. Despite its flexibility and easy access to learning materials, the impact and acceptance of online learning remain debatable as it can vary depending on several influencing factors.

There are mixed findings from many researchers on the opportunities, challenges, and experiences UiTM students encountered in adapting to online learning (Aziz & Jabar, 2024; Nik Md Salleh et al., 2022; Othman et al., 2022). A few advantages of the online learning experience for students include the increase of global access to learning materials, flexible

learning time, and increased collaboration through interactive media such as Google Meet, Webex, Padlet, or Microsoft Teams. However, these advantages do not guarantee the success of online learning because the nature of online learning relies mostly on learning motivation, students' participation, time management, integration between educators and students, as well as the suitability of the technological platform used. For the differences in learning behaviour among UiTM students, these factors may impact the online learning experience success and effectiveness.

In this research, the main focus is on examining how significant the student behaviour, obstacles in communications and limitations in technological infrastructure impact online learning among UiTM students. One of the key factors that will impact online learning is student behaviour where students rely on their own direction and effort in self-learning. Some students may encounter difficulties following and adapting to the online lesson since it requires students to have high level of self-discipline and focus, good time management, and independent study habits. Therefore, the investigation into the impact of online learning experience considering students' behaviour as a variable of concern is essential as it contributes to the effectiveness of the online learning environment and hence significantly affects students' academic performance.

Another important variable that needs to be considered is the limitation of access to technology. In an online setting, having access to the online platform remains a major challenge for the online learning experience. Students' participation in online lesson is hindered due to inadequate devices, unstable internet coverage, and a lack of technology skills. UiTM students come from diverse socio-economic backgrounds and localities with different capabilities to access technology, especially students from low-income families and from rural areas. The lack of access to technology gives challenges to students to focus and obviously affecting student's engagement and motivation in online learning (Christanti et al., 2024; Tang et al., 2025). This limitation brings concern to the effectiveness of online learning despite having the wide range of digital learning media options.

Another factor that is considered important for online learning experience is the effective communication between educators and students. This factor contributes to the success of knowledge transfer and opportunities to facilitate students with feedback, real time discussion and interaction that will positively influence students' understanding of the lesson delivered (Deep et al., 2025; Akpen et al., 2024). Insufficient communication due to limited opportunities to connect with the instructor or delayed responses and feedback provided by the instructor might impact students' emotions and weaken students' engagement to online learning experience especially among UiTM students who are accustomed to face-to-face guidance, interaction and student monitoring.

By considering all the challenges encountered in conducting online learning, this research seeks to examine four influencing aspects which are the online learning experience, student behaviour, lack of communication, and lack of technology. By analysing all the listed factors, this research is expected to provide findings that will contribute to the improvement of learning quality in UiTM specifically.

Literature Review

Online Learning Experience

Online learning is a type of education that is delivered through digital technologies and the internet, allowing for teaching, learning activities, and interactions between students and teachers without the need for physical classroom attendance (Akpen et al., 2024; Lomellini et al., 2025). One key area of study is whether learning and knowledge transfer take place more successfully in online classes than in traditional face-to-face instruction. According to empirical data, online learning can produce learning outcomes that are on par with or even better in some circumstances. However, their effectiveness and satisfaction depend on many factors such as the quality of digital tools, a reliable internet connection, and student motivation. These factors collectively contribute to students' online learning experience, which reflects how students perceive, participate in, and adapt to the online learning environment. For instance, among the numerous studies from 2019 to 2024 by Akpen et al. (2024), some reported better academic performance because of the flexibility and accessibility of online learning.

Previous studies show that student behaviour significantly shapes their online learning experiences and outcomes, particularly through engagement, interaction, motivation, and self-regulation (Getenet et al., 2024). Better academic performance has been linked to social presence, active participation in online discussions, peer collaboration, and consistent engagement with course material (Levin, 2024; Miao & Ma, 2022). Furthermore, online platforms offer greater flexibility, allowing students to learn at their own pace. However, according to Getenet et al. (2024) and Akpen et al. (2024), students frequently experience poorer engagement and feelings of isolation when they lack motivation or fail to interact with peers and teachers which can negatively affect their overall online learning experience. Another important aspect relates to its structure and organization. Studies comparing online and face-to-face teaching note that the effectiveness of online learning is significantly influenced by students' ability to interact with instructors and peers, the quality of online platforms, and the level of distractions in students' environments, all of which may differ from a traditional classroom. Some have highlighted that instructors are unable to view students' reaction during online teaching (Sonnenberg & Rutledge, 2024). Due to this, studies on Malaysian university students found that students still view traditional face-to-face provide clearer structure, guidance, and interaction with lecturers (Ng & Chan, 2022). Salarvand et al., (2023) have documented communication challenges in online learning including less socializing, limited opportunities for feedback, besides reduced interactions between the students and instructors which may consequently affect students' online learning experience. .

Another crucial role in shaping the effectiveness of online learning is technology. Technology influences the content accessibility, interactions, and engagement of learning activities. Recent studies found that the use of digital platforms and information and communication technologies (ICT) could improve student engagement, flexibility, and accessibility in learning (Akpen et al., 2024; Kusumo et al., 2025). Students with sufficient digital skills and stable internet access tend to demonstrate higher engagement (Risdianto et al., 2025; Navarro et al., 2024). Besides, some believed that delivery in online learning required less real-time teacher guidance (Shin et al., 2023). However, students can face challenges such as technical issues and distractions that make online learning harder. These findings suggested that students' acceptance of online learning still largely depends on the availability and effectiveness of technology that consequently influences their online learning experience.

Student Behaviour

Switching to virtual classrooms has completely changed the way university students learn, causing students' behaviour to change as well. In a traditional campus setting, the physical presence of lecturers and peers naturally imposes a structured routine. However, online learning removes these external physical boundaries, transferring the responsibility of learning entirely to the student. Hence, in this context, a high level of self-regulated learning (SRL) is required. Some students can cope with the autonomy as a learner, while others face challenges with the new requirement of strict time management, which can contribute to higher incidences of procrastination (Biwer et al., 2021). Students often are tempted to put off their homework when teachers are not around, distracted by their homes or by other digital media not used in the school curriculum (Pelikan et al., 2021).

Moreover, digital devices have brought new behavioural issues, such as digital exhaustion or screen fatigue. The constant online classes, with accompanying virtual assignments, require a tremendous amount of mental effort which can leave students feeling drained and distracted (Fauville et al., 2021). Therefore, motivation and active involvement of students are likely to decrease throughout a semester. Students' passive learning behaviours, including but not limited to camera off, silence in classroom, multitask learning, etc., make their learning experience worse as well (Peper et al., 2021).

Although the barriers are there, it is also valuable to note that there have been positive behavioural adaptations in some learners as a result of online learning. The need to use different digital platforms has unwittingly promoted the digital literacy and problem-solving ability of students (Aguilera-Hermida, 2020). A great advantage of the learning model is that it is asynchronous, so that if the student has a very active motivation to learn, he can plan the use of his time to the maximum, which in turn has a beneficial impact on the process of autonomous learning and taking responsibility for his own learning (Bączek et al., 2021). In closing, the effects of online learning on student behaviour are not one dimensional and can be either a positive or a negative ultimately shaping students' online learning experience. For some, it helps them develop positive independent learning habits, meanwhile for others, it can be a source of procrastination and disengagement because there is no physical classroom.

Lack of Communication

The physical separation of online learning demands significant behavioral changes, but its most fundamental impact is the disruption of natural human communication. The college experience is deeply rooted in socializing, whether it's a spontaneous discussion in the lecture hall or studying together. These interactions are expressed in very limited ways when learning is completely virtual and can cause a number of psychological and academic issues. One of these is the general feeling of loneliness. When students don't have the physical presence of a campus community, they often state that they feel lonely and less connected to their college or university (Kaufmann & Vallade, 2020). This prolonged isolation causes them to have poor mental health, as well as affecting academic satisfaction and anxiety (Elmer et al., 2020).

In addition to the personal effects, the absence of direct interaction makes it difficult for students to work collaboratively and cooperatively with one another. In the traditional classroom, students may need to discuss the material after class to get clarification and to brainstorm ideas. This is because spontaneous interactions are nearly impossible in the virtual

space. Teamwork becomes very structured, like group assignments, and relies heavily upon text communication or pre-scheduled video calls, which tend to be less productive than in person interactions. As a result, students face a higher risk of miscommunication, unequal workloads, and difficulties in building rapport with their peers (Alawamleh et al., 2020). Furthermore, having no shared physical space makes it much more difficult to develop trust and rapport for good teamwork (Gares et al., 2020).

In addition, this virtual barrier substantially strains the rapport between students and their lecturers. Online learning often results in a one-way transmission of information. In a virtual classroom, students generally do not speak up, as they are not sure if they can turn on their camera and unmute themselves during the class (Castelli & Sarvary, 2021). This “black screen” effect poses a serious pedagogical challenge for the lecturer, who is losing important soft communication skills like eye contact, facial expression and body language, which are essential for determining if the class is following the lesson or not (Mottet, 2020). This leads to a loss of communication, leaving students feeling unhelped and discouraged from asking for assistance which in turn affects the overall teaching and learning process.

Lack of Technology

Online learning at the higher education level requires reliable devices and a stable internet connection to facilitate students’ engagement, self-directed learning, and academic performance, which are often affected by unreliable devices and poor internet access. Students with good technical skills and digital instruments are more confident in using computers. They are more ready for online learning and can manage their studies independently (Soekarno et al., 2024). Universities also play an important role in providing and maintaining technology-supported learning environments towards students’ readiness for mobile learning (Normalini et al., 2024).

Students can participate actively in classes during online learning because of good access to technology and stable internet (Loi et al., 2024). Therefore, adequate technological access is an important component of a positive online learning experience. The pandemic necessitated online learning, which is challenging for students from less privileged backgrounds. Students’ progress was hindered by limited access to devices, unstable internet, and fewer opportunities for meaningful learning. The internet was unstable, and there were fewer opportunities for meaningful learning (Subramaniam et al., 2024). Technical issues and unstable connections hindered learning even for students with their own devices (Wan Mustafa et al., 2025).

Thus, the lack of technology is not only a practical problem, but it also influences students’ behaviour and engagement in online classes. If the internet is unreliable or devices are limited, students have fewer chances for real-time interaction with lecturers and classmates. This could be harmful to their self-discipline and time management and lower the overall effectiveness of online learning. Providing better access to technology is important as it can help students from various socio-economic and geographic backgrounds in Malaysia to gain more benefit from more equitable, engaging, and effective hybrid and online learning in UiTM.

Methodology

The target population for this study is the diploma students from the Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM) Machang, Kelantan. This study

employs a quantitative approach, utilizing a questionnaire survey. According to the statistics obtained from the three programmes, there were 796 enrolled students at the time of data collection. Using the Raosoft Sample Size Calculator with a 9% margin of error, the target sample size for this population size was 104. However, due to poor response rates, this study obtained only 98 samples. Considering the complexity of the proposed model and the desire for robust analysis, a sample size of 98 was deemed appropriate. This sample size allowed for sufficient statistical power to detect significant relationships between the variables and increased the reliability and generalizability of the findings.

Convenience sampling was used to select samples from the population because it is easy to use and low-cost. This technique is a nonprobability sampling method in which participants are selected based on their accessibility, availability, and proximity to the researcher. This method does not involve random selection; instead, respondents are chosen because they are easy to reach within a limited time frame or resource constraint. An online survey using closed-ended questions was designed using Google Forms to collect the data from selected respondents. In this study, online learning experience is defined as students' overall perception and satisfaction with virtual learning. Operationalized as the dependent variable, online learning experience was measured using a 5-item scale assessing key aspects such as knowledge transfer, flexibility, time efficiency, and digital engagement on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). After going through various existing literature, the conceptual framework and the hypothesis of this study are as indicated in Figure 1. The study examines student behaviour, lack of communication, and lack of technology as the independent variables, while online learning experience is treated as the dependent variable.

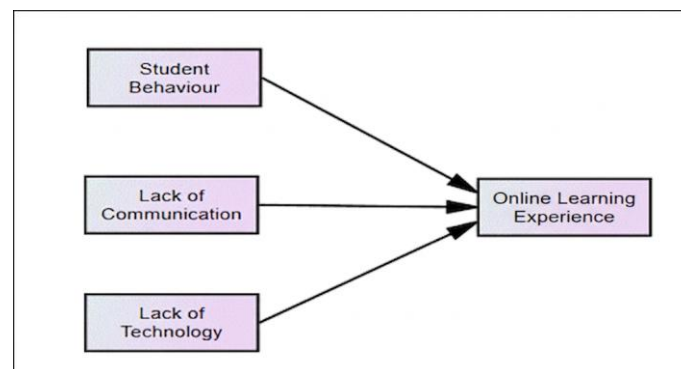


Figure 1: Conceptual Framework for Impact of Online Learning Experience among Students

Results And Findings

Reliability Testing

The reliability analysis of the scales utilized for measurement in the research was assessed using Cronbach's alpha. The measure of internal consistency for each construct must exceed a minimum value of 0.6. Sekaran & Bougie (2016) and Awang (2014) suggest that a Cronbach's alpha value of more than 0.6 indicates reliable instruments for research. The reliability analysis verifies the instrument's reliability for online learning experience, student behaviour, lack of communication, and lack of technology. Table 1 reveals that the Cronbach's alpha values are more than 0.6 for all variables, indicating acceptance of reliability.

Table 1: Reliability Assessment

Variables	No. of items	Reliability (Cronbach's alpha)
Online Learning Experience	5	0.643
Student Behaviour	5	0.842
Lack of Communication	5	0.712
Lack of Technology	5	0.644

Normality Assessment

Table 2 displays the kurtosis and skewness values for each variable. The data are normal if the absolute skewness and kurtosis values are 2.0 or lower (Hair et al., 2010). The results indicate that all skewness values are between 0.097 and 0.226 and kurtosis values are between -0.740 and 1.149, which are within the acceptable range. This implies that the data are normally distributed for all constructs.

Table 2: Normality Assessment

Variables	Skewness	Kurtosis
Online Learning Experience	0.226	0.845
Student Behaviour	0.144	0.497
Lack of Communication	0.097	1.149
Lack of Technology	0.193	-0.740

Demographic Profile of the Respondents

The demographic components covered gender, age, programme, and semester in Table 3. From the output, most respondents are female (70.4%), while the male respondents constitute only 29.6%. Their average age was 19.93 years, with a standard deviation of 0.900 years. The respondents are from different program consists of Diploma Science Mathematics (50.0%), Diploma Science Computer (25.5%), and Diploma Statistics (24.5%). Most of the respondents (63.3%) are from semester 5, followed by 29.6% from semester 3, 5.1% from semester 1, and only 2.0% from semester 4. There is no participation in this study from semester 2.

Table 3: Respondents Profile

Demographic	Frequency (n = 98)	Percentage (%)
Gender		
Male	29	29.6
Female	69	70.4
Age		
(Mean $\pm$ Standard Deviation)	(19.93 $\pm$ 0.900)	
Programme		
Diploma Science Mathematics	49	50.0
Diploma Science Computer	25	25.5
Diploma Statistics	24	24.5
Semester		
1	5	5.1

2	0	0.0
3	29	29.6
4	2	2.0
5	62	63.3

Multiple Linear Regression (MLR)

This study examined the impact of online learning experience among students from the Faculty of Computer and Mathematical Science. The R-square of 0.446 indicates that 44.6% of the total variation in the impact of online learning experience was explained by student behaviour, lack of communication, and lack of technology. The model is statistically significant, as the F-test is 25.235 with a p-value (0.000) less than 0.05. Table 4 reveals that student behaviour, lack of communication, and lack of technology have a statistically significant impact on online learning experience among university students.

Table 4: Coefficient of Regressions Analysis

Variables	B	t	Sig.
(Constant)	0.903	2.776	0.007
Student Behaviour	0.177	2.402	0.018
Lack of Communication	0.301	3.197	0.002
Lack of Technology	0.289	3.837	0.000
F	25.235	Sig.	0.000
R	0.668	R-Square	0.446

Conclusion

This study examined the main factors affecting the impact of online learning experience among diploma students at UiTM Cawangan Kelantan. The Multiple Linear Regression (MLR) model explained 44.6% of the total variance in online learning experience, demonstrating that student behaviour, communication barriers, and technological limitations collectively play a significant role in determining the impact of the online learning experience.

A comparison of the regression coefficients shows that lack of communication exerted the strongest relative effect ($B = 0.301$, $p = 0.002$), followed by lack of technology ($B = 0.289$, $p < 0.001$) and student behaviour ($B = 0.177$, $p = 0.018$). These findings suggest that the effectiveness of online learning experience depends on more than access to the right technology. It also requires reliable internet connectivity and devices, clear communication between students and instructors, and students who are self-motivated and able to manage their time effectively which all of it contribute to a more effective online learning experience.

In conclusion, improving online learning experience in higher education requires addressing both digital inequality and communication gaps. Universities must invest in equitable technology support for all students, ensuring that infrastructure limitations do not become a barrier to learning. In addition, teaching methods that promote active learning and structured self-directed learning should be introduced to enhance the quality of education and strengthen student engagement and improve the overall online learning experience.

This study has several limitations. First, the data relied entirely on a self-reported questionnaire, which introduces the possibility of response bias or exaggeration; students may have inaccurately assessed their own experiences, potentially underreporting or overreporting the severity of the behavioural, technological, and communication challenges they faced. Second, the relatively small sample size of 98 respondents increases the margin of error and limits the generalisability of the findings. Future research should therefore employ larger sample sizes across different faculties and universities to better represent the wider student population. Finally, combining this quantitative approach with qualitative methods is recommended to enhance the depth and accuracy of future findings.

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Author Contribution Statement: All authors (Siti Haslini Zakaria, Nurul Hafiza Ismail, Fadila Normahia Abd. Manaf, Nurul Akma Mohd Rasat, and Nik Nur Amiza Nik Ismail) contributed equally and significantly to the development of this manuscript. The specific responsibilities, such as conceptualization, methodology, supervision, data collection, analysis, interpretation of results, literature review, drafting, and critical revision, were shared dynamically across the entire team. All authors read and approved the final version of the manuscript prior to submission.

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