



Investigating Online Learning Effects on Iraqi Postgraduate Students' Performance during the Period of COVID-19 in Malaysia

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The COVID-19 pandemic has drastically altered global education systems, compelling higher institutions to shift to online learning. This study investigates the impact of online learning on the academic performance of Iraqi postgraduate students in Malaysia during the pandemic. Drawing on a quantitative approach, data were collected through a structured online questionnaire distributed to 90 students across multiple Malaysian universities. The study examines four main factors: learner dimensions, technological characteristics, teacher characteristics, and course management. Using SPSS for statistical analysis, findings reveal that teacher characteristics, course management, and learner dimensions significantly affect students' academic performance, whereas technological characteristics show no significant influence. These findings underscore the importance of

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pedagogical and institutional support over technical infrastructure in determining student success in online education. The study offers valuable insights for educators and policymakers to enhance online learning strategies, particularly for international students in crisis contexts.

Keywords: COVID-19; online learning; student performance; Iraqi postgraduate students; Malaysia; teacher characteristics; course management.

1. INTRODUCTION

The COVID-19 pandemic, declared a global emergency by the World Health Organization in early 2020, triggered unprecedented disruptions across sectors, most notably in education (Quadir & Zhou, 2021; Nikas et al., 2022). Higher education institutions worldwide were compelled to transition rapidly from traditional classroom settings to fully online learning environments (Almusharraf & Khahro, 2020). While this shift aimed to ensure continuity in academic delivery, it presented a range of challenges, particularly for international students navigating educational systems in foreign countries under crisis conditions.

In Malaysia, where a substantial number of Iraqi postgraduate students are enrolled, the government's Movement Control Order (MCO) and other restrictions further emphasized the reliance on remote learning (Sia & Abbas, 2021). For these students' nonnative speakers of English the shift to online education not only disrupted academic routines but also amplified issues related to learner engagement, technological infrastructure, teacher-student interaction, and course management (Gopal et al., 2021; Azlan et al., 2020).

Although several studies have examined student satisfaction and online learning implementation during the pandemic (Aldhalemi et al., 2021; Lassoued et al., 2020; Mezaal, 2021), few have focused specifically on how these dynamics influence academic performance, especially among international postgraduate students from developing countries such as Iraq. Furthermore, existing literature often overlooks the combined impact of multiple instructional and systemic factors on learner outcomes.

This study addresses that gap by exploring the effects of four core variables learner dimensions, technological characteristics, teacher characteristics, and course management on the academic performance of Iraqi postgraduate students studying in Malaysia during the pandemic. Grounded in Achievement Goal

Theory (Elliot, 2005), this research seeks to offer evidence-based insights to inform future practices in online education delivery, particularly in crisis-affected, multicultural academic environments.

2. LITERATURE REVIEW

The global shift to online learning during the COVID-19 pandemic spurred a wide body of research examining student attitudes, instructional quality, and the effectiveness of remote education models. Barzani (2021) found that Kurdish EFL university students held predominantly negative perceptions toward online learning, citing issues with motivation, access, and engagement. Similarly, Yunus et al. (2021) revealed that while performance expectancy strongly influenced postgraduate TESL students' willingness to engage in e-learning, other factors such as social influence and facilitating conditions also played significant roles.

Bahasoan et al. (2020) examined students from West Sulawesi University and highlighted both strengths and inefficiencies in online learning. The study noted that although platforms like WhatsApp were widely used and accessible, high data costs and inconsistent internet connectivity hindered effectiveness. Hosen et al. (2022), in a study involving Bangladeshi students, found that the absence of private devices, low engagement levels, and emotional distress such as anxiety and depression significantly affected students' online learning experience.

From the Iraqi context, Aldhalemi et al. (2021) evaluated e-exams and found that the majority of instructors and students questioned their reliability, recommending blended learning with proper infrastructure as a more effective alternative. Likewise, Ameen et al. (2019) assessed e-learning adoption at Salahaddin University-Erbil and discovered substantial obstacles including poor internet connectivity, limited digital literacy, and insufficient institutional support.

Mezaal (2021) demonstrated that blended learning techniques significantly improved English language proficiency among Iraqi secondary students, affirming the pedagogical value of integrating face-to-face elements. Meanwhile, Sharma et al. (2020) conducted a large-scale survey in Nepal that revealed only moderate satisfaction with online learning, noting a wide disparity in student experiences.

Boardman et al. (2021), investigating liberal arts students in the U.S., found that while students maintained strong connections with instructors via Zoom, many struggled with motivation and procrastination. These findings align with international trends, such as those reported by

Lassoued et al. (2020), who emphasized barriers related to pedagogy, technological infrastructure, and student readiness.

Collectively, these studies underscore the multifaceted nature of online learning success. However, few have directly examined the interaction of multiple factors learner behaviour, technological infrastructure, teacher support, and course management on academic performance, particularly for non-native English-speaking postgraduate students. This study aims to fill that gap by employing Achievement Goal Theory (Elliot, 2005) to frame a comprehensive analysis of the factors influencing Iraqi postgraduate students' performance in Malaysian universities.

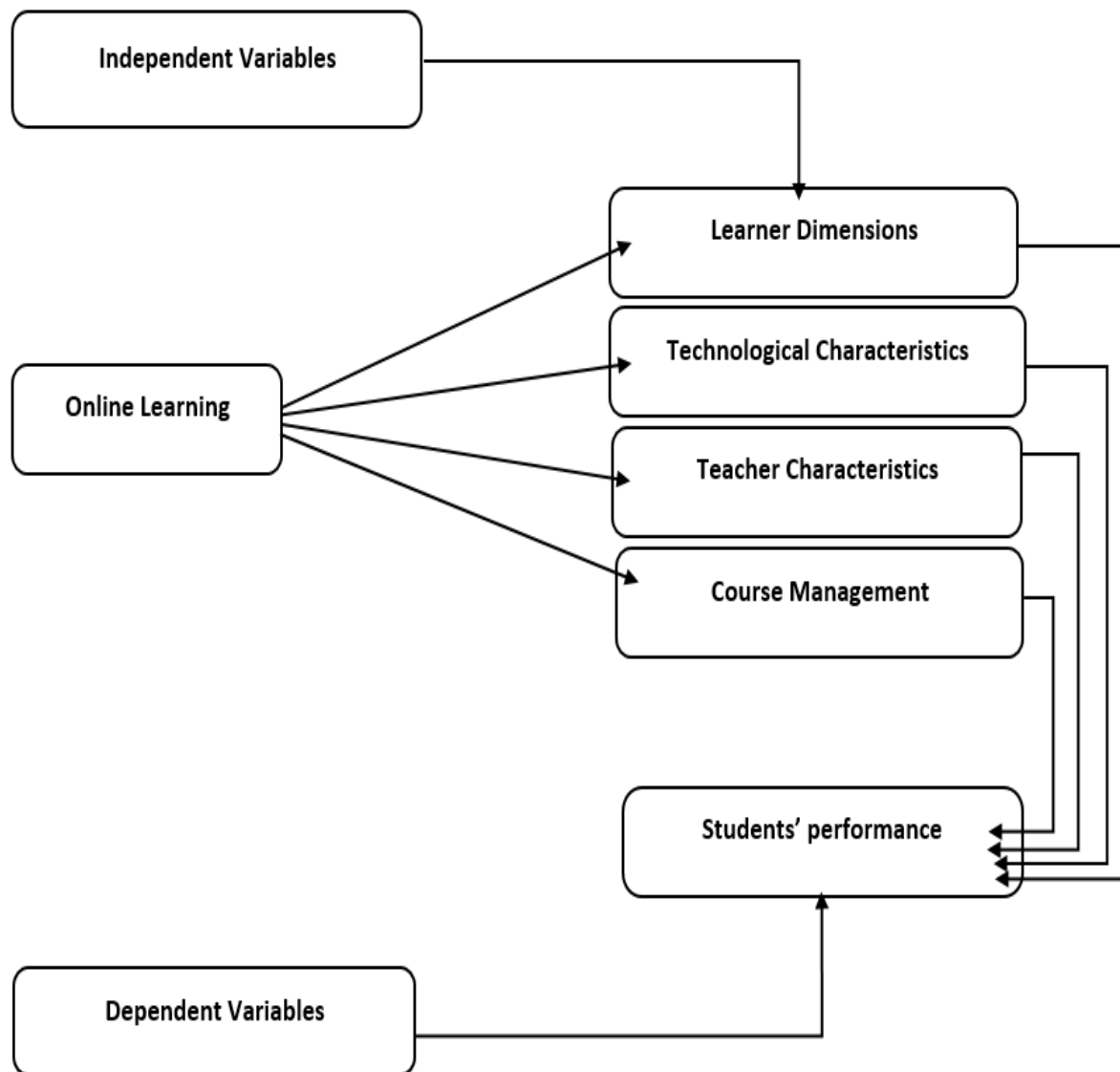


Fig. 1. Theoretical framework: online learning factors affecting student performance

3. METHODOLOGY

This study adopts a quantitative research design to investigate the effects of online learning on the academic performance of Iraqi postgraduate students during the COVID-19 pandemic in Malaysia. A structured, self-administered questionnaire was utilized as the primary data collection tool to assess the influence of four independent variables learner dimensions, technological characteristics, teacher characteristics, and course management on student performance.

3.1 Participants and Sampling

The target population consisted of Iraqi postgraduate students enrolled in various Malaysian universities. Based on statistics from the Education Malaysia Global Services (EMGS), the total number of Iraqi postgraduate students was 497. A sample of 90 students was selected using simple random sampling, ensuring representativeness while maintaining feasibility under pandemic-related restrictions. Participants included both Master's and PhD students across universities such as UUM, UPM, USM, and others.

The Fig. 2. presents statistical data of Iraqi postgraduate students.

3.2 Instrumentation

The questionnaire used in this study was adapted and refined from prior validated instruments (Aldhalemi et al., 2021; Boardman et al., 2021; Gopal et al., 2021; Sharma et al., 2020). It comprised 23 items distributed across five sections: demographic information, learner dimensions (8 items), technological characteristics (4 items), teacher characteristics

(4 items), and course management (4 items), followed by 3 items evaluating student performance. Responses were measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

3.3 Data Collection Procedure

The questionnaire was distributed electronically via Google Forms due to pandemic-related limitations. Ethical considerations, including informed consent, anonymity, and voluntary participation, were fully observed. Participants were assured that their responses would remain confidential and used solely for academic purposes. The timeframe of data collection was done in July 2022 over a period of 2 weeks to provide students free time to fill up the questionnaire even though the questionnaire did not take more than 10 minutes to fill the information given. The researcher did not remind the participants during the period of data collection.

3.4 Validity and Reliability

To ensure instrument validity, three layers were verified:

3.5 Data Analysis

Data were analysed using SPSS version 23. Descriptive statistics (means, standard deviations) were used to summarize participants' responses. Inferential analyses included correlation and regression to examine the relationship between the independent variables and student performance. The study also applied exploratory factor analysis to validate the underlying dimensions of the constructs.

Table 1. Three layers were verified for instrument validity

Validity assessment model	Description
Content validity	To the extent to which the instrument accurately measures all aspects of concepts.
Construct validity	The range to which the instrument measures the intended concepts.
Criterion validity	The extent to which the instrument corresponds with other scales that test similar variables.

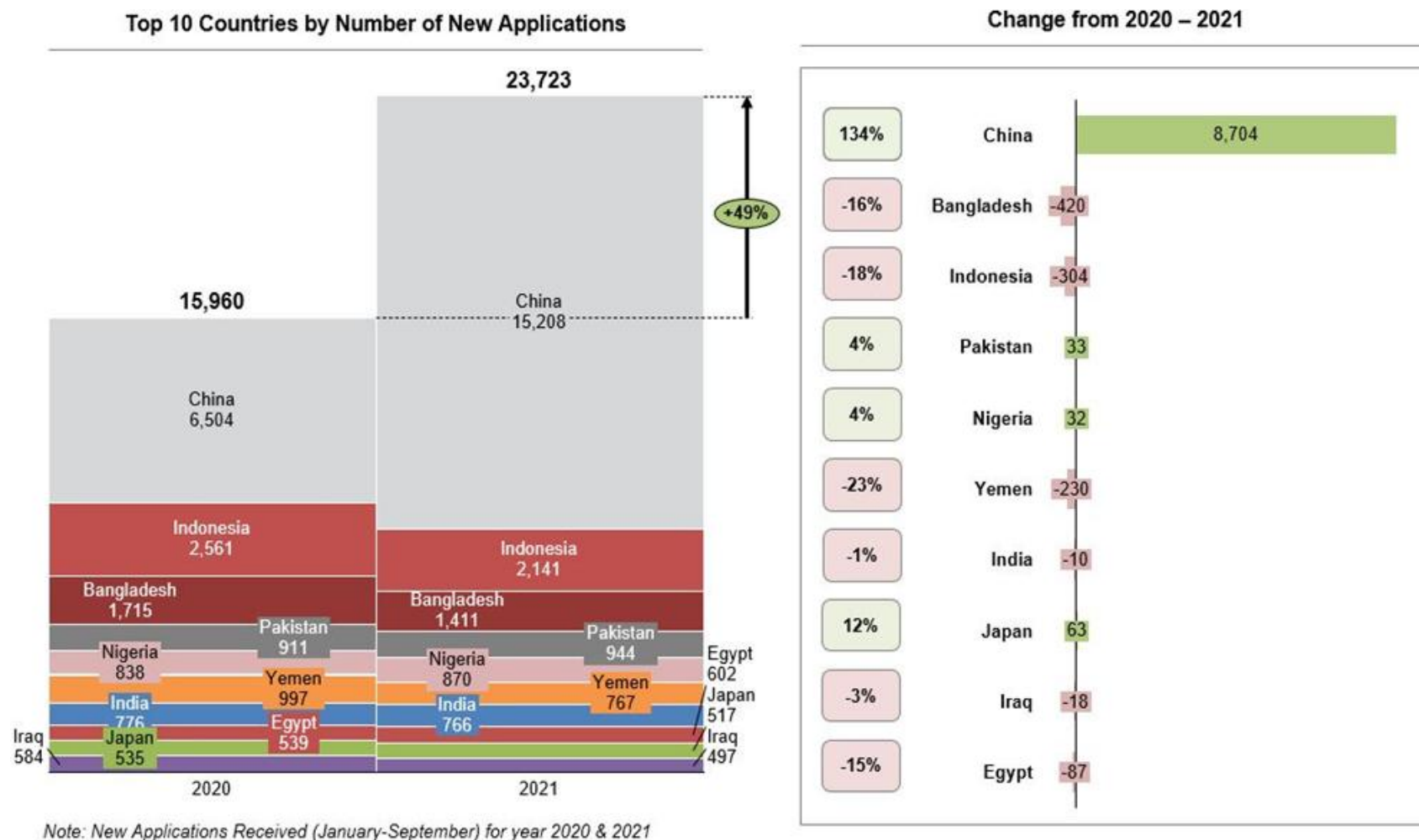


Fig. 2. Statistical data of Iraqi postgraduate students

4. RESULTS AND ANALYSES

This section presents the results of the study and provides a comprehensive discussion of the findings in light of the research questions and the literature reviewed earlier. The analyses were conducted using SPSS version 23 based on data collected from 90 Iraqi postgraduate students in Malaysian universities during the COVID-19 period. The results include descriptive statistics, correlation analysis, and regression analysis for the four independent variables (learner dimensions, technological characteristics, teacher characteristics, and course management) in relation to student performance.

4.1 Descriptive Statistics

The first stage of analysis involved examining the participants' responses to items measuring the core variables of the study. Descriptive statistics were used to explore the general trends of learner dimensions, technological characteristics, teacher characteristics, course management, and student performance.

The results in the Table 2 reveal that the mean scores for learner dimension items ranged from 2.83 to 3.63, with LD5 (related to students' motivation or time management) showing the highest average. This indicates that students had relatively positive perceptions of their engagement in online learning, particularly in managing their academic responsibilities. However, the lower mean score for LD2 suggests that participation in discussions or interactive activities might have been less satisfactory.

For technological characteristics, the means were relatively high, ranging between 3.91 and 4.16. This suggests that despite known infrastructure issues in some regions, most students had access to stable platforms and internet services. Notably, item TC3 received the highest mean, indicating strong agreement regarding the ease of using technological platforms.

Teacher characteristics also received high ratings, particularly items related to feedback and instructor engagement (TCC3 and TCC4), reflecting students' satisfaction with teacher involvement in online settings.

Course management dimensions showed moderate to high mean scores, especially items CM2 and CM1, pointing to organized course

planning and structure. Nevertheless, CM4 (likely related to content complexity or pacing) had a slightly lower mean, indicating room for improvement in course content delivery.

The internal consistency for each construct was assessed using Cronbach's alpha. All constructs scored above the acceptable threshold of 0.70, confirming the reliability of the instrument. Course management recorded the highest alpha value (0.907), indicating very strong consistency among its items. Student performance had the lowest, yet acceptable, reliability (0.700), which still supports the use of these measures in further analyses.

4.2 Correlation Analysis

The Pearson correlation test was conducted to examine the relationships between the independent variables and the dependent variable (student performance).

The results showed a significant positive correlation between learner dimensions and student performance, suggesting that students' engagement, attendance, and time investment positively impact their academic outcomes. Similarly, teacher characteristics and course management were significantly correlated with performance, highlighting the critical role of pedagogical support and course structure in student success.

Interestingly, technological characteristics did not show a statistically significant correlation with performance, indicating that while access to technology was present, it was not a decisive factor in academic success. This finding aligns with studies indicating that digital tools alone are insufficient without pedagogical quality and learner motivation.

4.3 Regression Analysis

To further understand the predictive power of the independent variables on student performance, multiple regression analysis was conducted.

The regression model was found to be statistically significant, confirming that the combination of learner dimensions, teacher characteristics, and course management explains a meaningful portion of the variance in student performance. Among these, teacher characteristics and learner dimensions emerged as the most powerful predictors.

Table 2. The table shows statistics of the general trends of learner dimensions, technological characteristics, teacher characteristics, course management, and student performance

Items	Mean	Standard Deviation
Learner dimension		
LD1	3.06	1.074
LD2	2.83	1.104
LD3	2.96	1.131
LD4	3.59	.911
LD5	3.63	.893
LD6	3.49	.915
LD7	3.34	.850
LD8	3.49	.963
Technological characteristics		
TC1	3.91	1.167
TC2	4.02	1.081
TC3	4.16	.970
TC4	4.08	1.104
Teachers' characteristics		
TCC1	3.77	1.028
TCC2	3.97	.867
TCC3	4.02	.960
TCC4	4.07	.946
Course management		
CM1	3.71	1.183
CM2	3.79	1.127
CM3	3.70	1.185
CM4	3.51	1.292
Student performance		
SP1	4.08	.796
SP2	3.49	1.063
SP3	3.44	1.029

Table 3. Reliability analysis of different variables using Cronbach's alpha

Reliability Analysis

Variable	no: of items	alpha
Teachers' characteristics	4	0.780
Course management	4	0.907
Student performance	3	0.700
Technological characteristics	4	0.841
Learner dimensions	8	0.799

Course management also contributed positively, albeit to a lesser extent. Meanwhile, technological characteristics remained statistically insignificant as a predictor. This

emphasizes the argument that online learning outcomes are not solely technology-driven, but rather influenced by student behaviours and educator practices.

Table 4. The table shows the results of the Pearson correlation test

	LD	TC	CM	SP	TCC
LD	1				
TC	.313**	1			
CM	.492**	.453**	1		
SP	-.035	.218*	.588**	1	
TCC	.451**	.499**	.337**	-.071	1

Table 5. Regression analyses

Model	R	R ²	adjusted R ²	std error
1	.719	.517	.494	.54551

Table 6. Anova analysis

Model	df	f	sig
Regression	4	22.714	.000
Residuals	85		

Table 7. Coefficient analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant) ^a	3.583	.377		9.492	.000
Learner Dimension	-.429	.112	-.355	-3.840	.000
Technological Characteristics	.063	.080	.074	.794	.430
Course Management	.582	.067	.803	8.646	.000
Teachers Characteristics	-.226	.097	-.218	-2.340	.022

a*= Student Performance

Table 8. Summary of findings

Research Objectives	Research Questions	Hypotheses	Results	Decisions
To determine the effects of learner dimensions on Iraqi students' performance.	What are the effects of the learner dimension on Iraqi students' performance?	Learner dimension has a significant effect on Iraqi students' performance.	significant	supported
To investigate the effects of technological characteristics on Iraqi students' performance.	To what extent do technological characteristics affect Iraqi students' performance?	Technological characteristics have a significant effect on Iraqi students' performance.	insignificant	not supported
To examine the influence of teachers' characteristics on Iraqi students' performance.	What is the influence of teachers' characteristics on Iraqi students' performance?	Teachers' characteristics have a significant effect on Iraqi students' performance.	significant	Supported
To determine the effects of course management on Iraqi students' performance.	What are the effects of course management on Iraqi students' performance?	Course management has a significant effect on Iraqi students' performance.	significant	supported

5. DISCUSSION

The present study aimed to examine how various dimensions of online learning influence the academic performance of Iraqi postgraduate students in Malaysia during the COVID-19 pandemic. The findings confirm that student performance in online learning environments is not shaped by technological access alone, but rather by a complex interplay of learner behaviours, instructional quality, and course organization.

Among all the variables studied, learner dimensions stood out as a significant factor influencing academic outcomes. Students who reported better time management, active participation, and consistent engagement tended to perform more effectively in online settings. This echoes Karagianni (2024), emphasized, that metacognitive organization enhance self-regulated learning, which is critical role for fill the gaps in distance and open learning.

Teacher characteristics also emerged as a strong predictor of performance, underscoring the continuing importance of instructor presence, guidance, and feedback in digital learning. Even in the absence of face-to-face interaction, students responded positively to educators who maintained communication and offered motivation. This aligns with studies like Gopal et al. (2021) and Wegerif (2019), confirmed that social dimension significantly influenced learning and should use to design the course regardless of teaching programs used.

While course management had a moderate effect, its significance cannot be dismissed. Organized content delivery, timely provision of materials, and structured class planning all contributed positively to student satisfaction and academic consistency. These findings align with Mtebe and Raisamo (2014), who argued that clear instructional design enhances the adoption and effectiveness of online learning systems.

Contrary to expectations, technological characteristics did not have a statistically significant impact on student performance. This finding may be explained by the fact that most postgraduate students already possess a functional level of technological readiness, and thus, variations in access or tool usability may no longer be critical differentiators. This is consistent with Ameen et al. (2019), who concluded that while infrastructure is a necessary precondition, it

is insufficient on its own to drive educational success without pedagogical quality and student engagement.

Taken together, these results suggest that the human factors within online education particularly student effort and instructor involvement are more influential than the technical platform itself. This has significant implications for universities and policymakers, who often prioritize digital tools but may overlook the social and motivational elements of learning. To ensure the effectiveness of online learning, investments should not only focus on technology, but also on enhancing teacher training, improving course design, and developing student self-regulation strategies (Marzano et al., 1993).

6. CONCLUSION

This study investigated the effects of various components of online learning, learner dimensions, technological characteristics, teacher characteristics, and course management on the academic performance of Iraqi postgraduate students in Malaysian universities during the COVID-19 pandemic. The findings revealed that learner engagement, teacher involvement, and course organization had significant impacts on performance, while access to technology alone was not a determining factor. These results provide strong evidence that student success in online environments depends far more on human and pedagogical elements than on digital infrastructure. The role of the learner emerged as especially crucial. Students who demonstrated self-motivation, time management, and active participation achieved better outcomes. This reinforces the broader educational view that independent learning skills are key to thriving in non-traditional settings. Similarly, the significance of teacher characteristics highlighted the continued importance of educator presence and guidance in maintaining student engagement and emotional connection. Structured course design also played a positive role, suggesting that well-organized content and logical sequencing can offer much-needed clarity in virtual learning environments. Although technology serves as the vehicle for online instruction, the findings showed that its presence alone does not guarantee better outcomes. When students already have sufficient access to devices and platforms, other variables such as instructional quality and learner attitudes become the primary drivers of academic success. This has important implications for

university administrators and policymakers, who often focus on providing tools but may overlook the training and support needed to use them effectively. To improve learning outcomes, institutions must invest not only in platforms but also in preparing educators to design interactive, student-centered virtual environments, and in fostering learner autonomy. This study contributes to the theoretical discourse by reaffirming the principles of Achievement Goal Theory (AGT), which posits that performance is influenced by students' goal orientations, motivations, and learning strategies. In this context, mastery-oriented learners those who seek to understand and grow were more likely to succeed in online formats, particularly when guided by responsive instructors.

Practically, the study results explored the need for more sophisticated approaches to online education, especially in multicultural and crisis-impacted academic setting. However, for Iraqi postgraduate students studying in Malaysia, the shift to online learning during the COVID-19 pandemic showed that academic achievement is significantly influenced by learner autonomy, technological access, instructor engagement, and effective course design. Consequently, institutions require not to invest in technological infrastructure but also provide targeted support such as culturally responsive teaching strategies, language-sensitive academic writing workshops, and training for faculty on online engagement tools. Nevertheless, future improvements may also encompass mentorship programs and flexible course management systems tailored to the needs of international students, thereby fostering more equitable and effective learning experiences in virtual settings.

By drawing attention to the human factors within digital education, this research provides a foundation for designing more resilient and inclusive online learning systems. It emphasizes that while the pandemic may have forced an abrupt transition, the long-term success of online education depends on meaningful engagement, thoughtful instructional design, and the psychological readiness of all participants involved. However, future research may expand the study results by comparing international students' expertise across linguistic backgrounds, or multicultural or by investigating how these human-centered characteristics evolve in post-pandemic hybrid learning contexts. On the other hand, mixed-method or longitudinal studies may also encompass deeper

insights into the sustained effects of these kinds of variables on academic performance.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The author(s) hereby declare that NO generative AI technologies—such as Large Language Models (e.g., ChatGPT, Copilot) or text-to-image generators—were used in the writing or editing of this manuscript.

CONSENT

As per international standards or university standards, Participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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APPENDIX

Appendix A: Questionnaire design

Online learning effects on Iraqi postgraduate students' performance across Malaysia.

Age:

{1}15-20 Years {2}21-25 Years {3} 26-30 Years {4} 31-35 Years {5} 35 and above

Gender:

1- Male 2- Female

Education Level

1- Master 2- PhD

Location

1-UUM, 2- USM, 3- UKM, 4-UPM, 5- other please specify -----

Instructions:

For each item in the survey below, please identify how much you **agree** or **disagree** with statements by putting ✓a signal in the box on the right side for each item. Your answers will be kept strictly and will not be identified. The questionnaire below does not affect your academic level, and you have the choice to fill it out or reject it.

Likert scale 1- Strongly Disagree 2- Disagree 3- Neutral 4- Agree and 5- Strongly Agree.

<i>Learner dimension</i>					
<i>Items</i>	<i>SD</i>	<i>D</i>	<i>N</i>	<i>A</i>	<i>SA</i>
1. Online education affects students' performance effectively.					
2. I study more efficiently with online learning					
3. I got enough time to study on my own, enhancing my self-studying habit					
4. I feel online learning orients my study plan and enhances students' motivation, creativity, cognitive skills, and problem-solving skills					
5. I always participate in class discussions.					
6. Online learning provides students with much more time to study.					
7. I lose several linguistic skills while using online learning.					
8. While I am learning online, I got the greatest knowledge, and I feel confident about graduating.					
<i>Technological characteristics</i>					
9. I can always access my lectures without any technical problems.					
10. Sometimes I lose some information due to technical errors such as weather and					

internet signal weakness.

11. I found the quality of graphic aids such as sound and picture (PPT) being displayed excellently.

12. Students feel confident when they conduct their classes.

Teachers' characteristics

13. I found instructors' explanations about the course and materials' effectiveness.

14. Instructors always provide students with positive encouragement.

15. Instructors always respond to students' questions

16. I found that instructors have good accessibility and professional behavior during the class

Course management

17. I found an online education course beneficial for postgraduate students.

18. I am satisfied with the content of topics covered during the classes.

19. I found online learning achieves the outcomes of the study effectively.

20. I found online learning system is equal to physical study.

Students' performance

21. Online classes have encouraged me to develop my own academic interests as far as possible

22. Online classes have improved my written communication skills

23. This course has helped me develop the ability to plan my own work

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