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Online Learning And Quality Of Education During Covid-19 Pandemic: Evidence From Pakistani Universities

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Abstract

This study examines how online learning improves teacher competence, family cooperation, educational quality, and environmental impact in Pakistan during the COVID-19 pandemic. A self-administered questionnaire was given to Pakistani university students, and 296 replies were collected via purposive sampling. PLS-SEM was employed in the investigation using Smart-PLS 3.2.8. Results show that online education increased environmental quality during the COVID-19 epidemic. During this pandemic, family engagement was positively connected with online learning effectiveness. Online learning affected education quality during the COVID-19 epidemic. It was shown to improve educators' skills.

Participation in instructor-led discussions and submission of course evaluations are essential for students to help advance this research throughout the pandemic. Incorporating these strategies will allow schools to implement novel concepts that boost the pandemic response's overall effectiveness. If students follow their professors' directions and actively participate in class discussions, exercises, and assignments, they will learn more.

Keywords: Online Learning Usefulness, Quality of Education, COVID-19 Pandemic, Pakistan.

1. Introduction

Online education is prevalent nowadays due to the internet's growth. This revolutionary teaching style is gaining popularity and could influence the region. (Lestari et al., 2021). Many students are leaving conventional colleges to study online due to the high demand for online courses and certificates. Numerous research have sought to explain virtual education students' success and contentment (Al-Quran et al., 2023; Salas-Pilco et al., 2022; Stecuła & Wolniak, 2022).

The worldwide COVID-19 pandemic has changed schooling, according to Elangovan and Parayitam (2022) and Sharif Nia et al. (2023). The pandemic, which began in Wuhan, China, and expanded to over 200 nations, has caused serious issues and cost schools worldwide (Munir et al., 2023). This rare condition necessitated quick implementation of online schooling, with mixed results. Due to infrastructural issues, several Pakistani schools failed to switch to online education (Fatima et al., 2023). By August 26, 2020, Pakistan had about 250,000 COVID-19 cases (Chikileva et al., 2023; Pokhrel & Chhetri, 2021). Schools worldwide had to close, requiring nearly 68 million youngsters to study online. This exposed educational, privacy, and security challenges in the nation (Rudolph et al., 2023).

Despite the global crisis, the research highlighted online courses' advantages for group work, assessment, and education (Moeed et al., 2022). Contemporary online courses encompass diverse elements, including introductory materials, written assignments, online discussions, and individual or group projects (Ndamukunda et al., 2023). The quality of the educational experience is intrinsically tied to student satisfaction and the educational needs of students, further

emphasizing the relevance of several variables in ensuring a high-quality learning experience (Hassan, 2021; Elumalai et al., 2021; Yekefallah et al., 2021). COVID-19 has offered opportunities for institutions to adapt and improve their education delivery, defining objectives, standards, processes, and accountability (Adedoyin and Soykan, 2023). In this context, the success of educational institutions is closely linked to effective management, resource provision, and adherence to ambitious standards (Reshi, 2023; Jiang et al., 2023; Abdelfattah et al., 2023).

However, the quality of education during the pandemic is contingent on a robust curriculum that incorporates effective educational management principles (Cahaya et al., 2022). Simultaneously, parents, students, and educators have raised questions about what constitutes exemplary teaching in an online learning environment, underscoring the need for well-prepared instructors with appropriate content knowledge, pedagogical skills, and adaptability (Petrila et al., 2022; Yu et al., 2022; Yassine et al., 2022; Aziz et al., 2022; Mbhiza, 2021).

Furthermore, schools play a vital role in shaping the holistic development of students, encompassing their academic, social, and personal growth. However, the pandemic has presented unprecedented challenges in providing a conducive learning environment and engaging students (Mbhiza, 2021; Mustakim et al., 2021). This scenario has elevated the significance of assessments and their role in evaluating student performance and improving teaching practices (Malik et al., 2023; Zhu et al., 2023).

Section 2 explores the literature, Section 3 research methodology, Section 4 data analysis, Section 5 results presentation, and Section 6 consist of discussion and analysis of the research results. After the study, we will provide valuable comments, suggestions, and future research directions.

2. Review of the Literature

2.1 The Impact of Students' Attitudes and Beliefs in Online Learning

Students' opinions regarding computer-based education affect online learning. These attitudes will shape technology-assisted learning, study shows (Adedoyin & Soykan, 2023; Alvarez-

Rivero et al., 2023; Shabu, 2023). These attitudes also affect online educational resources, which may affect students' learning results (Li et al., 2023b; Zhang et al., 2023). Online learning environments need effectiveness, multimedia integration, self-directed learning, and instructor-guided learning (Lima and Isotani, 2022). SDT is a common paradigm for studying online learning qualities including adaption, ease, flexibility, and engagement. It illuminates pupils' self-control (Rosli & Saleh, 2023).

2.2 Factors Influencing Online Learning

Online learning gives students interest, user interaction, efficiency, and flexibility (Ishak et al., 2022; Qiu et al., 2022). Younger generations choose online or hybrid courses for their convenience and versatility (Korte et al., 2022). Online learning settings encourage involvement and provide students more time for replies and critical thought (Syam & Achmad, 2022; Tate & Warschauer, 2022). Additionally, blogging and other online platforms promote digital content creation and community learning (Deribigbe et al., 2022; Villalba, 2022; Yu, 2022).

Students' prior internet use and worldviews significantly affect their ability to apply knowledge gained through online courses (Altuwairesh, 2021; Li et al., 2023a). Understanding how students' beliefs about others' use of educational institutions and the internet influence their online learning behaviors remains a subject of interest (Osiesi et al., 2023).

2.3 Self-Regulated Learning and Student Performance

Self-regulated learning plays a crucial role in students' academic performance in online higher education programs (Abuhassna et al., 2022). Time management, effort regulation, metacognitive abilities, and critical thinking are key factors positively correlated with students' learning outcomes (Abuhassna et al., 2022). Social networking and online connections help reduce feelings of isolation in online learning environments (Warshawski, 2022; Turk et al., 2022; Baber, 2022). Such connections create positive meanings, contributing to student success, perceived learning, and social interaction (Plak et al., 2023).

2.4 Student Expectations and Instructor-Student Contact

Student satisfaction in online learning is influenced by their expectations, attitudes, and beliefs about the medium (Almaiah et al., 2022; Anthonysamy and Singh, 2023). The amount of online instructor-student contact is a significant factor in student happiness (Anthonysamy and Singh, 2023). The discussion board feature in online learning environments is widely appreciated by students (Hollister et al., 2022). A strong correlation exists between students' expectations and their level of satisfaction with online courses (Alsuwaida, 2022).

2.5 The Role of Instructors in Online Learning

The quality of instructors is a key component of student satisfaction in online learning (Armstrong et al., 2022). Students value teaching quality, expertise, preparedness, affordability, and support. Effective online teaching requires instructors to engage with students through various platforms, including newsletters, public conversation boards, blogs, and articles (Alismaiel et al., 2022; Mian & Al Lihabi, 2023; Rahmatullah et al., 2022; Simelane-Mnisi, 2023).

2.6 Internet Familiarity and Self-Efficacy

Student familiarity with the internet and digital tools significantly impacts their satisfaction with online courses (Alrayes et al., 2022; Iqbal et al., 2022). Online self-efficacy predicts student satisfaction with online learning (Bećirović et al., 2022). Self-regulated learning and self-efficacy are explored in the context of online education, providing insights into students' capacity to self-regulate their learning (Turan et al., 2022). Positive student perceptions of online learning foster a preference for this mode of education. These perceptions, in turn, enhance students' learning experiences and outcomes. Data from students in Australia support the notion that online learning facilitates self-regulated learning, empowering students to actively manage their resources, time, and learning approaches (Vezne et al., 2023).

2.7 Social Networking and Learning Outcomes

Social networking in online learning environments contributes to enhanced academic relationships, perceived learning, and positive interactions (Warshawski, 2022; Turk et al., 2022;

Baber, 2022). These connections create positive meaning for students, resulting in improved performance on examinations (Plak et al., 2023).

2.8 Instructor Quality and Student Success

Instructor quality, with a focus on expertise, preparedness, and support, plays a crucial role in students' success in online courses (Armstrong et al., 2022). Effective online instruction requires instructors to engage with students through various digital platforms, contributing to better learning outcomes (Alismaiel et al., 2022; Mian & Al Lihabi, 2023; Rahmatullah et al., 2022; Simelane-Mnisi, 2023). The influence of students' prior internet use and worldviews on their ability to apply knowledge gained through online courses is an area of ongoing research (Altuwairesh, 2021; Li et al., 2023a). Understanding how students' beliefs about others' use of educational institutions and the internet affect their online learning behaviors remains a subject of interest (Osiesi et al., 2023).

H1: Online learning during covid-19 has a significant effect on (a) quality of education, (b) quality of environment, (c) quality of teacher and (d) quality of family cooperation.

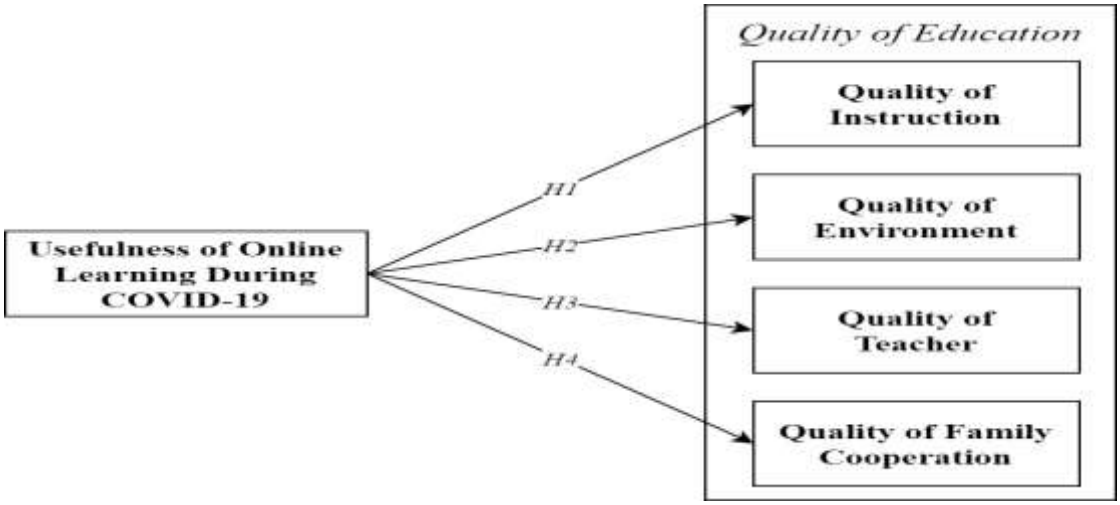

Figure 1: Research Framework

3. Methodology

3.1 Sampling Design

In this study, data was meticulously collected from subject matter experts, individuals well-versed in the topic under investigation, and possessing a wealth of relevant information

(Tongco, 2007). Given the objective of gathering data from individuals with substantial knowledge, deliberate sampling methodology was employed.

The sample size was determined utilizing the formula proposed by Krejcie and Morgan in 1970, expressed as 50 + 8K, where 'K' represents the number of latent constructs. According to this formula, the initial requirement was to gather data from a minimum of 90 respondents. However, to ensure a robust dataset for practical analysis, data was collected from 296 respondents, all of whom were university students in Karachi, Pakistan.

Among the 296 respondents, 137 (46.3%) were male, and 159 (53.7%) were female. In terms of age distribution, 54 (18.2%) fell within the 16 to 20 years age bracket, 227 (76.7%) were aged between 21 to 25 years, and 15 (5.1%) were between 26 and 30 years old.

Regarding educational qualifications, 36 (12.2%) were undergraduates, 182 (61.5%) held graduate degrees, and 78 (26.4%) were post-graduates. It is noteworthy that 149 individuals (50.3%) were engaging in distance learning programs for the first time, while 147 individuals (49.7%) had prior exposure to such courses.

3.2 Measures

The assessment of key variables in this study was carried out using rigorously selected and adapted measures from established sources. Each construct was evaluated using a five-point Likert scale, reflecting participants' responses on specific items.

- Online Learning during COVID-19: This construct comprises five items adapted from Shih et al. (2019). For instance, participants were asked to rate their agreement with statements such as "Conducting online courses improved my effectiveness."
    - Quality of Instruction: To gauge the quality of instruction, five items adapted from Ciftci and Karadag (2016) were employed. We gauged participant emotions using these remarks, like "I can easily share my thoughts and concerns with my teachers."
    - Quality of Environment: Ciftci (2015)-adapted five questions evaluated learning environment quality. This

is an opinion-based question presented to participants like "My University has modern equipment and technology."

- Quality of Teacher: With slight adjustments from Ciftci and Karadag (2016), five questions were utilised to record participants' teacher ratings. Some inquiry claims were "My teachers treat me with respect and care about me."
- Quality of Family Cooperation: Five items that were modified from Ciftci and Karadag (2016) were used to gauge the level of family collaboration. In order to get insight into their experiences, participants were asked to answer questions like : "What have I learned that is valuable for my future?"

The Likert scale employed throughout the study allowed participants to indicate the extent of their agreement or disagreement with each statement, thus facilitating a comprehensive evaluation of the various constructs under investigation

4. Data Analysis

To thoroughly examine the data gathered, the research used a strict method for data analysis. Partial Least Squares Structural Equation Modeling was one of the main techniques used for this (PLS-SEM). This approach was selected because it can accurately determine the correlations between the research variables and decipher the complex sequence of events that connects them, which is in line with the objectives of the study (Nitzl, 2018).

4.1 Measurement Model

Table 4.1 represents the measurement model.

Table 4.1: Measurement Model

Variables	Items	Loading	Composite Reliability	Average Variance Extracted (AVE)
Quality of Environment	QOE1	0.777	0.934	0.740

	QOE2	0.938		
	QOE3	0.916		
	QOE4	0.717		
	QOE5	0.929		
Quality of Family Cooperation	QOF2	0.972	0.970	0.942
	QOF3	0.970		
	QOI1	0.875		
	QOI2	0.921		
Quality of Instruction	QOI3	0.817	0.929	0.724
	QOI4	0.716		
	QOI5	0.907		
	QOT1	0.978		
Quality of Teacher	QOT2	0.988	0.983	0.951
	QOT5	0.960		
Usefulness of Online Learning during COVID-19	USE2	0.976	0.974	0.950
	USE4	0.973		

The data analysis in the table showed that every design had an external loading more than 0.70, the suggested cutoff threshold. Convergent validity must be ensured, it is advised, in line with Sarstedt et al. (2014), that values exceeding 0.70 be retained while those falling below 0.40 be omitted from the analysis. According to Hair et al. (2011), Composite Reliability (CR) should exceed 0.70 and Average Variance Extracted (AVE)

should exceed 0.50. Construct validity was obtained for all study components with CR and AVE values above these limits.

4.2 Discriminant Validity

Table 4.2 represents discriminant validity using the Fornell and Larcker (1981) criterion.

Table 4.2: Fornell-Larcker Criterion

	QOE	QOF	QOI	QOT	USE
Quality of Environment	**0.860**				
Quality of Family Cooperation	0.314	**0.971**			
Quality of Instruction	0.475	0.663	**0.851**		
Quality of Teacher	0.771	0.326	0.532	**0.975**	
Usefulness of Online Learning during COVID-19	0.639	0.092	0.586	0.864	**0.975**

As per research norms, we strictly followed the Fornell and Larcker criterion to determine discriminant validity (Fornell & Larcker, 1981). This requirement is met when the bold values along the correlation matrix diagonal are larger than those in the vertical configurations, as seen in the accompanying table. This conclusion supports the study's discriminant validity by showing that the components are distinct.

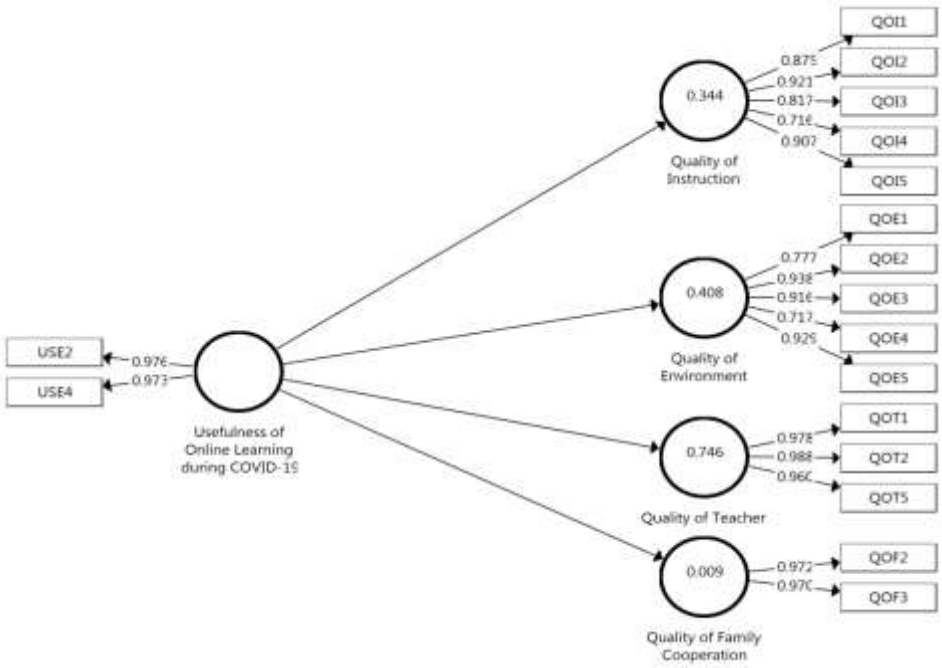

Figure 2: PLS Algorithm using Smart-PLS

Table 4.3 presents the HTMT ratio for discriminant validity.

Table 4.3: Heterotrait-Monotrait Ratio (HTMT)

	QOE	QOF	QOI	QOT	USE
Quality of Environment					
Quality of Family Cooperation	0.318				
Quality of Instruction	0.492	0.720			
Quality of Teacher	0.775	0.342	0.554		
Usefulness of Online Learning during COVID-19	0.651	0.096	0.625	0.895	

The HTMT ratio is used to assess discriminant validity in the research. According to Henseler et al. (2014), all table findings were below 0.90. It seems that the HTMT ratios demonstrated discriminant validity in the research.

4.3 Structural Model

Table 4.4 shows the route modeling study findings used to evaluate research assumptions. Two-tailed estimations and PLS bootstrapping with 5,000 subsamples provided reliable hypothesis testing in our study.

Table 4.4: Path Analysis for Hypothesis Testing

	Estimate	Std. Dev.	T-Stats	Prob.
Usefulness of Online Learning during COVID-19 -> Quality of Environment	0.639	0.039	16.530	0.000
Usefulness of Online Learning during COVID-19 -> Quality of Family Cooperation	0.092	0.057	1.607	0.054
Usefulness of Online Learning during COVID-19 -> Quality of Instruction	0.586	0.031	19.122	0.000
Usefulness of Online Learning during COVID-19 -> Quality of Teacher	0.864	0.016	53.675	0.000

The findings from the structural model analysis are as follows: The quality of the learning environment demonstrated a substantial influence from the utility of online learning during COVID-19 (0.639, P < 0.10). The quality of family collaboration was notably impacted by the usefulness of online learning during COVID-19 (0.092, P < 0.10). During the COVID-19 pandemic, the effectiveness of online learning exerted a significant influence on the caliber of teaching (0.586, P < 0.10). Lastly, the effectiveness of online education during COVID-19 was revealed to have a substantial impact on instructor quality (0.864, P < 0.10).

These results provide empirical support for the study's hypotheses, highlighting the intricate relationships between the variables under investigation.

4.4 Predictive Relevance

Table 4.5 provides an insight into the predictive relevance of the endogenous constructs within the model.

Table 4.5: Predictive Relevance

	R Square	R Square Adjusted	Q Square
Quality of Environment	0.408	0.406	0.267
Quality of Family Cooperation	0.009	0.005	0.008

Quality of Instruction	0.344	0.342	0.224
Quality of Teacher	0.746	0.745	0.669

Examining the R-squared values as presented in the table, it becomes evident that the independent components effectively account for and explain the observed levels of the following constructs: quality of family cooperation (0.9%), environmental quality (40.8%), quality of instruction (34.4%), and quality of teacher (74.6%), as indicated by the R-square values.

Furthermore, it is crucial to note that the Q-square values were not merely equal to zero; rather, they exhibited a significant departure from zero. This observation underscores the robustness and reliability of the model, confirming its predictive relevance in explicating the relationships among the study variables.

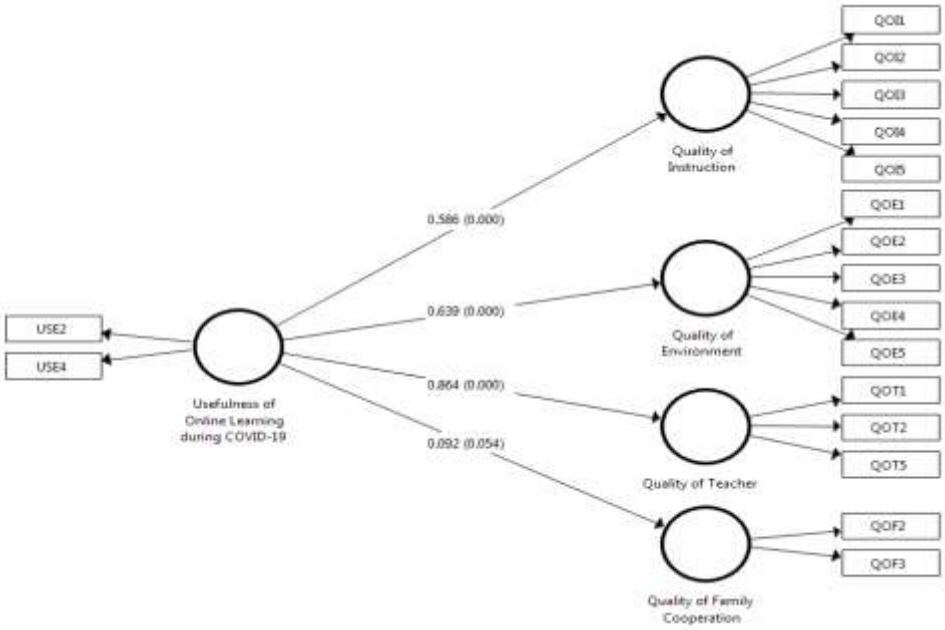

Figure 3: PLS Bootstrapping using Smart-PLS

5. Conclusion and Recommendations

This research has delved into the realm of online learning and its impact on the preparedness of students in Pakistan during the COVID-19 pandemic. Notably, self-directed learners have displayed a heightened interest in online education, aligning with existing research that has sought to categorize the effects of preparedness factors. However, it is evident that the ease of access to online learning, a responsibility that rests with

educational institutions, significantly influences students' readiness for online courses (Smith et al., 2003). The primary objective of this research is to provide further empirical evidence supporting the efficacy of online education during the ongoing COVID-19 pandemic.

Furthermore, our findings have unveiled a substantial impact on students' perspectives and course satisfaction, particularly among those who have faced academic setbacks. These results challenge previous research conducted by Bernard et al. (2004) and Morris (2010). It is probable that students offered a broader perspective on online learning, emphasizing factors such as convenience, accessibility, interaction, flexibility, knowledge acquisition, and seamless navigation. Those who hold a favorable view of online learning, encompassing these attributes, are more likely to actively engage in their courses, thus enhancing their chances of success, particularly during the COVID-19 pandemic.

This study also underscores the importance of examining the multifaceted impacts of COVID-19 on online learning. In contrast to previous research, the current study places novel emphasis on the role of parental involvement in online learning and the seriousness with which parents regard their children's academic pursuits. Given the inability of students to attend traditional classrooms due to the pandemic, the study suggests that online performance metrics may not accurately reflect the true extent of students' learning. Students are engaging with technology in unique ways, and online forums have emerged as a platform for student-led discussions and interactions during COVID-19.

Moreover, technology acts as a conduit for students' motivation to learn, which subsequently influences their participation in virtual classroom discussions. Teachers have the tools necessary for effective online class leadership and in-depth instruction. The study has demonstrated that an online discussion platform can effectively transfer the responsibility of posting assignments from the teacher to the students, who, after attending the lecture, are tasked with posting assignments in the discussion forum. COVID-19 has put educational systems worldwide to the test and has already prompted a significant shift toward online learning in educational institutions across the globe.

In light of the above, it is recommended that researchers investigating similar topics consider the following aspects. Firstly, researchers should acknowledge the limitations of their study, recognizing its inability to be generalized beyond a specific and well-defined scope. This research focused on small cohorts, specifically undergraduate students. Future research could incorporate a structural model to enhance the understanding of the relationships among exam results, online course performance, course satisfaction, and the course environment. Additionally, the research should encompass a broader array of variables that may impact perceptions of online learning. Interviews could be employed as an alternative to surveys. Further research is needed to explore additional principles in order to yield results that can be applied more broadly.

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