

Improving accounting knowledge of computerized accounting students through online learning: Perspective from the perception of students of Stmik Mardira Indonesia, Bandung, Indonesia

Iwan Sidharta ^{1*}, Marjito ², Asep Ririh Riswaya ², Retno Resawati ¹,
Ashila Dwiyanisa ¹, Octaviane Herawati ²

¹ Sekolah Tinggi Ilmu Ekonomi Pasundan, Bandung, Indonesia

² STMIK Mardira Indonesia, Bandung, Indonesia

*Corresponding author E-mail: iw.sidh@gmail.com

Received: March 19, 2025, Accepted: May 19, 2025, Published: May 27, 2025

Abstract

This study identifies the main issue faced by students in mastering accounting knowledge in the digital age, particularly among students enrolled in accounting information systems. The research aims to explore how both student and instructor perceptions of online learning can significantly influence the effectiveness of accounting education. We employed a survey approach involving 258 students and analyzed the data using Partial Least Square Structural Equation Modeling (PLS-SEM). The results indicate that positive perceptions among students regarding online learning have a significant impact on their learning effectiveness. Additionally, the findings highlight that instructors' perceptions of online learning also significantly affect the efficacy of the educational process. The novelty of this research lies in its in-depth focus on the interaction between student and instructor perceptions and their influence on learning outcomes in the context of computerized accounting. This study contributes valuable insights for developing better educational strategies and encourages educational institutions to consider perception factors when designing effective and adaptive online learning programs. Improving accounting skills in a digital context will help students better prepare for challenges in the workforce, support economic growth, and reduce inequality in the labor market.

Keywords: Accounting Knowledge; Student Perceptions; Instructor Perceptions; Online Learning.

1. Introduction

The primary problem in researching online learning and student understanding through technology applications is clarity. (Yunusa & Umar, 2021) Students often encounter difficulties when comprehending complex subjects presented through digital platforms. Based on studies like those by Kim et al. (2021), it's clear that students' willingness to embrace online learning systems directly affects their understanding of the material. The acceptance hinges not only on the technology itself but also on personal factors such as user innovativeness and social dynamics. In many cases, the design of these apps creates barriers rather than bridges. (Abed, Abdulbaqi & Shackelford, 2022; Baticulon et al., 2021; Nimavat et al., 2021) Take, for instance, the variability in how information is structured. Some students may find it overwhelming to navigate through the content, leading to a sense of confusion that clouds their understanding. Famularsih (2020) highlights that students' experiences using online learning applications during the COVID-19 pandemic vary significantly. This variability reveals that while some students navigate these platforms with ease, others struggle, causing gaps in their comprehension. According to Alismaiel et al. (2022) and Sidharta (2020), the interplay between online learning, mobile technologies, and social media significantly shapes the constructivist learning experience during the COVID-19 pandemic.

The lack of real-time feedback limits their ability to ask questions or clarify doubts, making them feel isolated in a sea of information. Moreover, the effectiveness of online learning varies across different demographics. Some students thrive in virtual settings, while others find it challenging. Further complicating this dynamic, Gligorea et al. (2023) emphasize the potential of adaptive learning using artificial intelligence in e-learning. While this approach promises personalization, its actual implementation raises concerns about accessibility and usability. These disparities raise questions about the inclusivity of technology in education. Researchers need to explore how these factors impact overall comprehension. (Alhabeeb & Rowley, 2018; Gunsekera, Bao & Kibelloh, 2019; Johansyah & Sidharta, 2020; Idkhan & Idris, 2023). The work by Mulyono et al. (2021) illustrates the use of communication platforms, such as WhatsApp, to facilitate online learning. However, the effectiveness of these applications in enhancing understanding remains questionable. If students do not perceive these tools as valuable or user-friendly, their ability to grasp concepts declines.

The shift from traditional classrooms to online environments has not fully addressed the importance of interactive learning. Tang et al. (2021) point to a stark variation in students' readiness for live online learning. Factors such as prior experience, technological literacy, and learning environment greatly influence how well students can engage with online materials. Students often miss the engagement that comes from face-to-face discussions, leading to deeper insights and understanding of the material. This gap is significant in educational research because it highlights the need for more effective tools that foster interaction and comprehension in online learning spaces. The problem lies in identifying how technology applications can be refined to enhance students' understanding in an online learning landscape. The primary challenge lies in understanding the factors influencing student acceptance of online learning technologies, the variability in their experiences, and the overall impact on comprehension. There is a critical need for research to explore these dynamics to ensure that online learning systems are effectively aligned with students' needs and learning goals.

In the realm of education, particularly in the field of accounting, the shift to online learning has sparked a pressing inquiry: how can we effectively enhance the knowledge of computerized accounting students through digital platforms? This question arises amid the increasing reliance on technology in higher education, especially considering recent global events that necessitated rapid adaptations. Some students find themselves grappling with the intricate concepts of accounting, often struggling to connect theoretical knowledge with practical applications. Despite access to numerous online learning tools, there is a noticeable gap in understanding how these resources can be optimized to foster deeper comprehension and engagement among students. Moreover, the diverse backgrounds and varying levels of technological proficiency among students introduce additional challenges. This disparity makes it crucial to investigate which online learning strategies can bridge these gaps in knowledge effectively. The core problem lies in determining the most effective online learning techniques that can improve the grasp of accounting principles and practices among students. This research seeks to shed light on these aspects, aiming to develop a framework that not only enriches knowledge but also empowers students to thrive in an increasingly digital landscape.

2. Literature reviews

The effectiveness of online learning among students has become a critical area of study, especially during the COVID-19 pandemic, which forced educational institutions worldwide to shift rapidly to digital formats. Research by Szopiński and Bachnik (2022) provides important insights into student evaluations of online learning, revealing that many students appreciated the flexibility and accessibility that online platforms offered. However, they also reported challenges such as technical issues and a lack of engagement compared to traditional face-to-face classes. This mixed feedback emphasizes not only the potential advantages of online learning but also the need for improvements in its delivery. However, their exploration stops short of linking these evaluations to specific learning outcomes or measuring how such feedback translates into academic performance, leaving a gap in understanding the direct impact of student evaluations on learning efficacy. Additionally, the study by Mushtaha et al. (2022) highlights the specific challenges and opportunities encountered in engineering and theoretical disciplines. The authors pointed out that while online learning provided new opportunities for technical skill development through various software and platforms, it also posed significant challenges related to practical applications and hands-on experiences, which are critical in these fields. This contrast illustrates that while students can benefit from theoretical knowledge delivered online, the lack of practical engagement can hinder their comprehensive understanding and learning outcomes. Nonetheless, a more detailed investigation is required to understand how these challenges specifically affect student motivation and engagement in varied disciplines. The implications of these challenges on long-term educational outcomes remain unexplored. Furthermore, Ulla and Perales (2021) explore the role of social media, particularly Facebook, as an integrated online learning support tool. Their findings indicate that students found value in utilizing such platforms for communication, collaboration, and resource sharing. It highlights that beyond traditional learning environments, social media can enhance student engagement and offer additional support, especially when formal instruction is lacking or less interactive. However, the study lacks comprehensive analysis regarding the effectiveness of different online platforms in fostering engagement and understanding. A comparative study investigating various social media tools and their distinctive roles in enhancing learning could provide more conclusive evidence on their effectiveness. Research conducted by Muflih et al. (2021) focuses on Jordanian medical students' attitudes and perceptions regarding online learning. The study highlights that while students generally accepted the shift to online education, they expressed concerns about the adequacy of practical training and the need for direct interactions with instructors and peers. Alsharida et al. (2021) review the adoption of mobile learning through TAM, but they do not consider the context of accounting education and students' understanding of computerized accounting. Tewari et al. (2023) developed a modified UTAUT to adopt online learning, yet they do not explore the relationship between accounting knowledge and the acceptance of digital platforms. Raza et al. (2021) expanded UTAUT related to LMS during the pandemic, but have not investigated technical support's influence on accounting learning. Pham and Dau (2022) discuss the readiness and success of online learning systems in Vietnam, but they do not explore students' perceptions of computerized accounting learning, creating a gap in understanding. Chatterjee et al. (2021) examine the influence of peer support and government backing in adopting vocational education technology, but they do not address the adoption of accounting learning technology. This situation opens opportunities to investigate how social and institutional factors affect students' perceptions of online accounting learning. Okoro et al. (2023) also identify determinants of immersive technology acceptance in the construction industry. Marandu et al. (2023) also apply UTAUT post-pandemic, but without the accounting context, which is crucial for understanding student perceptions. Similarly, Osei et al. (2022) integrate personality and motivation within UTAUT 2 for e-learning.

While informative, this research does not assess the broader implications of these attitudes on their preparedness for real-world medical practice. A gap exists in understanding how student perceptions influence practical skill development and clinical competencies in various medical training contexts. Alyoussef (2023) investigates the factors influencing the acceptance of e-learning in higher education, utilizing the task-technology fit model alongside the information systems success model. The findings indicate that students' acceptance is heavily influenced by the alignment of technology with educational tasks and objectives. However, an exploration of how different student demographics and backgrounds might alter the relevance of this fit could provide richer insights. There is a noticeable need for research that delves into the contextual factors that affect e-learning adoption among diverse student populations. Lytras et al. (2022) examine perceptions of distance learning in Mexico during the pandemic, exploring how these perceptions translate into innovation capabilities. Their exploratory study emphasizes that while students recognized the potential of online learning for fostering innovation and adaptability, they also pointed out the limitations regarding personal interactions and collaborative learning experiences. While they offer valuable insights, there is little exploration of how collaboration and peer interactions are influenced in online environments. Understanding the dynamics of online group work and its relation to innovation capacity remains another significant gap. Addressing these gaps will enhance the understanding of online learning's effectiveness, informing educational strategies that cater to diverse learner needs and contexts, particularly in practical and collaborative aspects of education.

3. Research methodology

This research investigates the perceptions of students and instructors regarding the effectiveness of online learning in improving students' accounting knowledge. Specifically, it targets the experiences of 258 students who have participated in an accounting information systems course. By employing a survey methodology, the study gathers insights through an online questionnaire facilitated via Google Forms. Understanding both student and instructor perspectives is crucial, as these perceptions can significantly shape the learning environment and influence educational outcomes. To assess various factors affecting learning effectiveness, the research utilizes measurement instruments based on established studies. Student perceptions, instructor perceptions, technology usage, and coordination frameworks are referenced from Sharma et al. (2020) and Elshami et al. (2021) while the effectiveness of online learning is analyzed using Yi-Shun Wang's (2003) criteria. By adopting Partial Least Squares Structural Equation Modeling (PLS-SEM), this study rigorously examines the relationships between these variables. The methodology not only validates the effectiveness of online learning experiences but also provides a comprehensive analysis of factors that can enhance students' engagement and academic performance in an online setting. Validity and reliability tests for the survey data follow criteria established by Hair, Risher, Sarstedt, and Ringle (2019). Specific measures include ensuring an Average Variance Extracted (AVE) greater than 0.5, with Composite Reliability (CR) and Cronbach's Alpha (CA) exceeding 0.7. Moreover, common method bias is addressed by confirming that the inner Variance Inflation Factor (VIF) remains below 4 and the Heterotrait-Monotrait (HTMT) ratio is less than 0.9. The hypothesis testing was conducted using bootstrapping methods as outlined by Hair and Alamer (2022), providing robust evidence for the findings. Ultimately, this research contributes valuable insights to the pedagogical practices in online learning environments and can inform future teaching strategies aimed at improving accounting education.

4. Research results and discussion

The respondents of this study consist of 258 students, predominantly male, who are in their third and fourth years of study. This demographic represents a mix of individuals likely to have substantial exposure to academic coursework and experiences in their respective programs. Considering gender differences, it is important to recognize that male and female students may approach online learning with different attitudes, experiences, and expectations. For instance, studies have shown that female students often prioritize collaborative and supportive learning environments, while male students might prefer competitive aspects. These differing preferences could influence how each gender perceives the effectiveness of online learning in enhancing their accounting skills. Third year and fourth-year students could have divergent perspectives regarding year-level differences based on their academic journeys. Third-year students, who are still building foundational knowledge, may perceive online learning as essential for developing their skills. Fourth-year students, nearing graduation, may focus more on how well online learning prepares them for real-world applications and employment opportunities. Their advanced standing in their studies may contribute to deeper insights regarding online learning effectiveness in accounting courses. Furthermore, the focus on male students reveals a potential area for further exploration in future research, particularly regarding gender dynamics and perceptions in online learning environments.

The assessment of common method bias is based on the VIF results from the inner model analysis. Here, the relationships among constructs reveal VIF values ranging from 1.094 to 1.395, which are all below the acceptable limit of 4. This finding indicates that the data fulfills the recommended criteria for common method bias. Additionally, the highest Heterotrait-Monotrait (HTMT) ratio recorded is 0.758, also under the threshold of 0.9. These results collectively suggest that the validity of the data is maintained, ensuring that the observed relationships are reliable and not significantly affected by common method bias.

Table 1: Validity And Reliability Test

Inst	LE	LR	T	MC	ES	AVE	CA	CR	VIF
LE1	0.712								1.892
LE2	0.708								1.748
LE3	0.787								2.234
LE4	0.809								2.280
LE5	0.811					0.538	0.891	0.912	2.376
LE6	0.818								2.553
LE7	0.631								1.556
LE8	0.608								1.524
LE9	0.681								1.540
LR1		0.651							1.309
LR2		0.746							1.778
LR3		0.812							2.045
LR4		0.781				0.566	0.846	0.886	1.808
LR5		0.760							1.993
LR6		0.753							1.806
T1			0.744						1.617
T2			0.804						2.048
T3			0.758			0.629	0.851	0.894	1.648
T4			0.803						2.047
T5			0.850						2.524
MC1				0.797					1.663
MC2				0.624					1.299
MC3				0.810		0.528	0.773	0.847	1.814
MC4				0.723					1.575
MC5				0.659					1.486
ES1					0.722				1.968
ES2					0.686				1.889
ES3					0.759				2.445
ES4					0.773				2.592
ES5					0.667	0.629	0.851	0.894	2.395
ES6					0.761				2.812
ES7					0.698				2.126
ES8					0.725				2.849

ES9	0.670	2.137
ES10	0.719	2.215
ES11	0.733	2.685
ES12	0.748	2.616
ES13	0.798	2.511
ES14	0.717	2.094

Table 1 illustrates the outer loading values for various constructs. For the learner construct, the values range from 0.608 to 0.818, while the instructor construct shows values between 0.651 and 0.812. The technology construct demonstrates a loading range of 0.744 to 0.850. Additionally, the coordination construct displays values from 0.624 to 0.810, and the effectiveness of online learning (ES) construct spans from 0.667 to 0.798. These values suggest strong validity, as all outer loading results exceed the threshold of 0.5. Moreover, the Average Variance Extracted (AVE) for these constructs is also greater than 0.5, further supporting their validity. The reliability of the constructs is confirmed, with Cronbach's Alpha and Composite Reliability values above 0.7. This indicates that the constructs are reliable measures. The VIF values range from 1.299 to 2.849, remaining under the limit of 4, which aligns with the criteria for common method bias. Overall, the results convey a well-structured model with valid and reliable constructs, lending credibility to the study's findings.

Table 2: HTMT Matrix Ratio Result

HTMT matrix	ES	LE	LR	MC	T
ES					
LE	0.543				
LR	0.476	0.330			
MC	0.706	0.525	0.533		
T	0.758	0.640	0.521	0.651	

Table 3: Path Value, R Value, R Square, F Squares, Inner VIF Value and Significance Result

Relationship	Path Value	F square	VIF	P value	Decision
LE -> MC	0.350	0.160	1.094	0.000	Accept
LE -> Tech	0.474	0.347	1.094	0.000	Accept
LR -> MC	0.336	0.149	1.094	0.000	Accept
LR -> Tech	0.309	0.147	1.094	0.000	Accept
MC -> ES	0.339	0.187	1.395	0.002	Accept
Tech -> ES	0.510	0.422	1.395	0.000	Accept
Effectiveness	R-square		R-square adjusted		
Coordination	0.559		0.555		
Technology	0.304		0.299		
	0.406		0.402		

Table 2 presents the HTMT ratio values, which range from 0.330 to 0.758, all of which are below the threshold of 0.9. This indicates that there is no significant correlation issue among the constructs, reinforcing the robustness of the measurement model. Meanwhile, Table 3 and Figure 1 reflect the path value results, which range from 0.309 to 0.510. Additionally, the f-squared values fall between 0.147 and 0.422, while the p-values range from 0.000 to 0.002. Referring to the effect size of the F-squared value, it is evident that the relationship LE -> MC is 0.160, LR -> MC is 0.149, and LR -> Tech is 0.147, along with MC -> ES at 0.187, indicating a moderate effect size. Meanwhile, the relationship LE -> Tech is 0.347, and Tech -> ES is 0.422, which impacts the latent variables significantly. These findings suggest that the path analysis conducted is indeed significant, providing strong support for the relationships evaluated in the study. Furthermore, the R-squared values ranging from 0.304 to 0.559 illustrate that the research model contributes well to explaining the phenomena under investigation. This level of contribution implies that the variables included in the model account for a considerable portion of the variance in the outcome measures, demonstrating the overall effectiveness of the proposed framework.

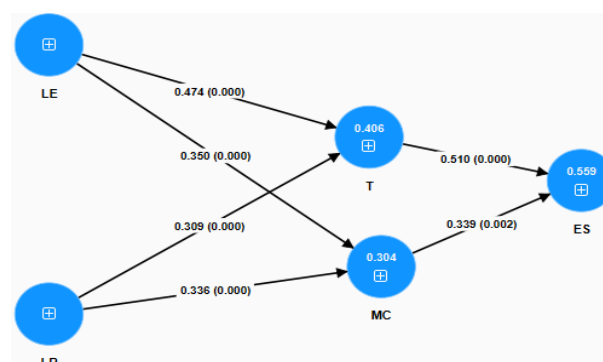


Fig. 1: The Overall Effectiveness of the Proposed Framework.

In examining the influence of student perceptions on the effectiveness of online learning, several studies offer compelling evidence demonstrating a significant relationship between these two factors. For instance, Panigrahi, Srivastava, and Panigrahi (2021) highlight the mediating role of student engagement in the context of perceived learning effectiveness. Their research indicates that when students hold positive perceptions of online learning tools and methodologies, their engagement levels increase, leading to enhanced learning outcomes. This suggests that fostering favorable perceptions about e-learning can create a more immersive learning environment, ultimately improving the effectiveness of online education. Further reinforcing this concept, Vikas and Mathur (2022) conducted an empirical study focusing on student perspectives regarding teaching styles and pedagogical approaches in online classes. Their findings reveal that students' perceptions significantly influence their overall satisfaction and perceived effectiveness of online learning. When educators employ strategies that resonate with students' learning preferences and actively solicit their input, students tend to exhibit a higher level of engagement, which in turn positively affects their academic performance. This connection between student perception and learning effectiveness underscores the importance of adaptive teaching methods in online environments. Additionally, the research by Al-Maroofo et al. (2021) explores how

students' perceptions of online learning platforms have evolved following the pandemic. This study examines behavioral intentions regarding the continued use of online learning tools and identifies that positive perceptions foster a willingness to engage with these platforms even after returning to face-to-face classes. Their findings imply that a favorable perception of online learning not only enhances immediate learning effectiveness but also shapes students' attitudes toward future educational experiences. These studies indicate that student perceptions of online learning are instrumental in determining the overall effectiveness of e-learning. The alignment of teaching methods, pedagogical approaches, and technological tools with students' expectations and experiences can lead to heightened engagement and better learning outcomes. Therefore, educators and institutions must consider student perceptions as a key factor in the design and implementation of online learning strategies. By prioritizing student feedback and adapting practices accordingly, educational stakeholders can enhance the effectiveness of online learning initiatives significantly.

The impact of instructors' perceptions regarding online learning on its overall effectiveness is a significant area of concern, particularly in the wake of the COVID-19 pandemic. Bordoloi, Das, and Das (2021) conducted a study focusing on perceptions of online and blended learning in the Indian context, revealing that faculty attitudes towards these modalities play a crucial role in shaping the quality of educational experiences. When instructors express a positive perception of online learning, it not only boosts their motivation to engage with the medium but also influences their pedagogical strategies, ultimately enhancing the effectiveness of the learning environment for students. Complementing this finding, Singh, Sharma, and Paliwal (2021) explore the adoption intentions and perceived effectiveness of digital collaboration platforms for online learning from students' perspectives. Their research indicates that the effectiveness of these platforms is significantly moderated by how instructors perceive and utilize them. Instructors who are comfortable and confident in their use of technology are more likely to design interactive and engaging learning experiences that facilitate student collaboration and participation. This correlation suggests that instructor perceptions not only affect the implementation of online tools but also directly influence student engagement and satisfaction with the learning process. Furthermore, Perera and Abeysekera (2022) investigate factors influencing learners' perceptions of e-learning during the pandemic. Their study emphasizes that the instructors' enthusiasm and adaptability towards online teaching significantly affect students' attitudes and perceptions of e-learning effectiveness. When faculty display a proactive approach, including regular feedback and support, it fosters a more positive learning environment, which enhances students' perceptions of the overall effectiveness of online education. These studies highlight that instructors' perceptions of online learning are fundamental to its success. Chopra et al. (2019) utilized a structural equation model to evaluate students' perspectives on the effectiveness of an e-learning portal. Their findings indicate that instructors who embrace online platforms and perceive them positively are more likely to create engaging and effective learning environments. When instructors demonstrate confidence and skill in utilizing e-learning tools, it enhances students' learning experiences and their overall satisfaction. Positive perceptions lead to increased engagement, innovative pedagogical approaches, and a supportive atmosphere for students, making the learning experience more effective. Nikou and Maslov (2021) further elaborate on the importance of perceptions by analyzing students' views on e-learning participation during the COVID-19 pandemic. Their research highlights that the effectiveness of online learning is significantly moderated by faculty attitudes towards these platforms. When instructors are perceived as supportive and adaptable, students are more likely to engage actively with the content, leading to improved learning outcomes. Phutela and Dwivedi (2020) provide qualitative insights into students' perspectives on e-learning adoption. Their study reveals that faculty perceptions strongly influence students' acceptance and motivation towards online learning. Consequently, educational institutions need to invest in training and development programs that empower faculty to embrace online learning modalities confidently, ensuring that their perceptions align to enhance educational effectiveness. Engaging faculty in discussions about technology integration and encouraging feedback on online teaching strategies can further create a conducive learning environment that benefits both instructors and students alike.

Enhancing accounting knowledge through online learning can significantly contribute to employability and outcomes in the labor market. Alam and Parvin (2021) assert that online higher education can be an active agent of change that influences academic success and job readiness, especially as effective online learning prepares students for the evolving demands of the job market. Mok et al. (2021) illustrate the impact of educational disruptions due to COVID-19 on competence development and student learning experiences; by improving accounting knowledge through computerized learning methods, students can develop skills more aligned with industry needs, thus enhancing their competitiveness in the labor market and their ability to adapt to current challenges. Van De Werfhorst et al. (2022) highlight that the digital divide in online education can affect learning outcomes, indicating the need for an inclusive approach to enhancing accounting knowledge, allowing all students to benefit from the educational opportunities available. By ensuring that instructors feel equipped and valued in the online learning landscape, the educational experience can be significantly enhanced for students, resulting in better academic outcomes and satisfaction with the learning process. This research shows that enhancing accounting knowledge through online learning not only creates direct benefits for the individuals involved in employability but also contributes to economic development and improved outcomes in the labor market.

5. Conclusion

The study conducted on accounting students utilizing a survey approach provides valuable insights into the perceptions and experiences of students regarding their learning journey in this subject. The findings reveal that students' attitudes toward online learning significantly influence their engagement and overall academic performance. Positive perceptions are associated with increased motivation and satisfaction, indicating the importance of fostering a supportive learning environment. Based on the findings, it is recommended that educators and institutions focus on enhancing the quality of online learning experiences in accounting courses. This can be achieved by offering professional development programs for instructors to improve their online teaching skills and encouraging the incorporation of interactive and engaging pedagogical strategies. Furthermore, seeking regular feedback from students can help in refining teaching methods and addressing any challenges they may face. By adopting effective learning methods and considering the factors of the digital divide, accounting education can act as a catalyst for creating a more skilled and future-ready workforce.

This study is limited by its reliance on a single survey approach, which may not capture the full complexity of students' experiences and perceptions. Additionally, the research is focused solely on accounting students within a specific institution, which may limit the generalizability of the findings to other academic disciplines or educational contexts. Future research could expand on this study by employing a mixed-methods approach, combining quantitative surveys with qualitative interviews to gain deeper insights into student perceptions. Exploring the experiences of students across different disciplines, as well as examining the long-term effects of online learning on academic performance, could provide a more comprehensive understanding of the factors influencing student success in a digital learning environment. Additionally, longitudinal studies could assess how perceptions evolve, especially about changes in teaching practices and technology adoption.

References

- [1] Abed, M. G., Abdulbaqi, R. F., & Shackelford, T. K. (2022). Saudi Arabian Students' beliefs about and barriers to online education during the COVID-19 pandemic. *Children*, 9(8), 1170. <https://doi.org/10.3390/children9081170>.
- [2] Alam, G. M., & Parvin, M. (2021). Can online higher education be an active agent for change?—Comparison of academic success and job-readiness before and during COVID-19. *Technological Forecasting and Social Change*, 172, 121008. <https://doi.org/10.1016/j.techfore.2021.121008>.
- [3] Alhabeeb, A., & Rowley, J. (2018). E-learning critical success factors: Comparing perspectives from academic staff and students. *Computers & Education*, 127, 1-12. <https://doi.org/10.1016/j.compedu.2018.08.007>.
- [4] Alsharida, R., Hammood, M., & Al-Emran, M. (2021). Mobile learning adoption: A systematic review of the technology acceptance model from 2017 to 2020. *International Journal of Emerging Technologies in Learning (IJET)*, 16(5), 147-162. <https://doi.org/10.3991/ijet.v16i05.18093>.
- [5] Al-Marouf, R. S., Alnazzawi, N., Akour, I. A., Ayoubi, K., Alhumaid, K., AlAhhabi, N. M., ... & Salloum, S. (2021, December). The effectiveness of online platforms after the pandemic: will face-to-face classes affect students' perception of their Behavioural Intention (BIU) to use online platforms?. In *Informatics* (Vol. 8, No. 4, p. 83). Multidisciplinary Digital Publishing Institute. <https://doi.org/10.3390/informatics8040083>.
- [6] Alismaiel, O. A., Cifuentes-Faura, J., & Al-Rahmi, W. M. (2022). Online learning, mobile learning, and social media technologies: An empirical study on constructivism theory during the COVID-19 pandemic. *Sustainability*, 14(18), 11134. <https://doi.org/10.3390/su141811134>.
- [7] Alyoussef, I. Y. (2023). Acceptance of e-learning in higher education: The role of task-technology fit with the information systems success model. *Heliyon*, 9(3). <https://doi.org/10.1016/j.heliyon.2023.e13751>.
- [8] Baticulon, R. E., Sy, J. J., Alberto, N. R. I., Baron, M. B. C., Mabulay, R. E. C., Rizada, L. G. T., ... & Reyes, J. C. B. (2021). Barriers to online learning in the time of COVID-19: A national survey of medical students in the Philippines. *Medical science educator*, 31, 615-626. <https://doi.org/10.1007/s40670-021-01231-z>.
- [9] Bordoloi, R., Das, P., & Das, K. (2021). Perception towards online/blended learning at the time of Covid-19 pandemic: an academic analytics in the Indian context. *Asian Association of Open Universities Journal*, 16(1), 41-60. <https://doi.org/10.1108/AAOUJ-09-2020-0079>.
- [10] Chatterjee, S., Bhattacharjee, K. K., Tsai, C. W., & Agrawal, A. K. (2021). Impact of peer influence and government support for successful adoption of technology for vocational education: A quantitative study using PLS-SEM technique. *Quality & Quantity*, 1-24. <https://doi.org/10.1007/s11135-021-01100-2>.
- [11] Chopra, G., Madan, P., Jaisingh, P., & Bhaskar, P. (2019). Effectiveness of e-learning portal from students' perspective: A structural equation model (SEM) approach. *Interactive Technology and Smart Education*, 16(2), 94-116. <https://doi.org/10.1108/ITSE-05-2018-0027>.
- [12] Elshami, W., Taha, M. H., Abuzaid, M., Saravanan, C., Al Kawas, S., & Abdalla, M. E. (2021). Satisfaction with online learning in the new normal: perspective of students and faculty at medical and health sciences colleges. *Medical education online*, 26(1), 1920090. <https://doi.org/10.1080/10872981.2021.1920090>.
- [13] Famularsih, S. (2020). Students' experiences in using online learning applications due to COVID-19 in English classroom. *Studies in Learning and Teaching*, 1(2), 112-121. <https://doi.org/10.46627/silet.v1i2.40>.
- [14] Gligorea, I., Cioca, M., Oancea, R., Gorski, A. T., Gorski, H., & Tudorache, P. (2023). Adaptive learning using artificial intelligence in e-learning: A literature review. *Education Sciences*, 13(12), 1216. <https://doi.org/10.3390/educsci13121216>.
- [15] Gunesequera, A. I., Bao, Y., & Kibelloh, M. (2019). The role of usability on e-learning user interactions and satisfaction: a literature review. *Journal of Systems and Information Technology*, 21(3), 368-394. <https://doi.org/10.1108/JSIT-02-2019-0024>.
- [16] Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review*, 31(1), 2-24. <https://doi.org/10.1108/EBR-11-2018-0203>.
- [17] Hair, J., & Alamer, A. (2022). Partial Least Squares Structural Equation Modeling (PLS-SEM) in second language and education research: Guidelines using an applied example. *Research Methods in Applied Linguistics*, 1(3), 100027. <https://doi.org/10.1016/j.rmal.2022.100027>.
- [18] Idkhan, A. M., & Idris, M. M. R. (2023). The impact of user satisfaction in the use of e-learning systems in higher Education: A CB-SEM approach. *International Journal of Environment, Engineering and Education*, 5(3), 100-110. <https://doi.org/10.55151/ijeedu.v5i3.91>.
- [19] Johansyah, M. D., & Sidharta, I. (2020). Exploring Trait Emotional Intelligent: Survey on Students during Covid-19. *Kontigensi: Jurnal Ilmiah Manajemen*, 8(2), 70-77. <https://doi.org/10.56457/jimk.v8i2.83>.
- [20] Kim, E. J., Kim, J. J., & Han, S. H. (2021). Understanding student acceptance of online learning systems in higher education: Application of social psychology theories with consideration of user innovativeness. *Sustainability*, 13(2), 896. <https://doi.org/10.3390/su13020896>.
- [21] Lytras, M. D., Serban, A. C., Ruiz, M. J. T., Ntanos, S., & Sarirete, A. (2022). Translating knowledge into innovation capability: An exploratory study investigating the perceptions on distance learning in higher education during the COVID-19 pandemic-the case of Mexico. *Journal of Innovation & Knowledge*, 7(4), 100258. <https://doi.org/10.1016/j.jik.2022.100258>.
- [22] Marandu, E. E., Mathew, I. R., Sivotwa, T. D., Machera, R. P., & Jaiyeoba, O. (2023). Predicting students' intention to continue online learning post-COVID-19 pandemic: extension of the unified theory of acceptance and usage technology. *Journal of Applied Research in Higher Education*, 15(3), 681-697. <https://doi.org/10.1108/JARHE-02-2022-0061>.
- [23] Mok, K. H., Xiong, W., & Bin Aedy Rahman, H. N. (2021). COVID-19 pandemic's disruption on university teaching and learning and competence cultivation: Student evaluation of online learning experiences in Hong Kong. *International Journal of Chinese Education*, 10(1), 221258682110070. <https://doi.org/10.1177/22125868211007011>.
- [24] Muflih, S., Abuhammad, S., Al-Azzam, S., Alzoubi, K. H., Muflih, M., & Karasneh, R. (2021). Online learning for undergraduate health professional education during COVID-19: Jordanian medical students' attitudes and perceptions. *Heliyon*, 7(9). <https://doi.org/10.1016/j.heliyon.2021.e08031>.
- [25] Mulyono, H., Suryoputro, G., & Jamil, S. R. (2021). The application of WhatsApp to support online learning during the COVID-19 pandemic in Indonesia. *Heliyon*, 7(8). <https://doi.org/10.1016/j.heliyon.2021.e07853>.
- [26] Mushtaha, E., Dabous, S. A., Alsyouf, I., Ahmed, A., & Abdraboh, N. R. (2022). The challenges and opportunities of online learning and teaching at engineering and theoretical colleges during the pandemic. *Ain Shams Engineering Journal*, 13(6), 101770. <https://doi.org/10.1016/j.heliyon.2021.e07853>.
- [27] Nimavat, N., Singh, S., Fichadiya, N., Sharma, P., Patel, N., Kumar, M., ... & Pandit, N. (2021). Online medical education in India—different challenges and probable solutions in the age of COVID-19. *Advances in medical education and practice*, 237-243. <https://doi.org/10.2147/AMEP.S295728>.
- [28] Nikou, S., & Maslov, I. (2021). An analysis of students' perspectives on e-learning participation—the case of COVID-19 pandemic. *The International Journal of Information and Learning Technology*, 38(3), 299-315. <https://doi.org/10.1108/IJILT-12-2020-0220>.
- [29] Okoro, C. S., Nnaji, C., & Adediran, A. (2023). Determinants of immersive technology acceptance in the construction industry: management perspective. *Engineering, construction and architectural management*, 30(7), 2645-2668. <https://doi.org/10.1108/ECAM-06-2021-0476>.
- [30] Osei, H. V., Kwateng, K. O., & Boateng, K. A. (2022). Integration of personality trait, motivation and UTAUT 2 to understand e-learning adoption in the era of COVID-19 pandemic. *Education and Information Technologies*, 27(8), 10705-10730. <https://doi.org/10.1007/s10639-022-11047-y>.
- [31] Panigrahi, R., Srivastava, P. R., & Panigrahi, P. K. (2021). Effectiveness of e-learning: the mediating role of student engagement on perceived learning effectiveness. *Information Technology & People*, 34(7), 1840-1862. <https://doi.org/10.1108/ITP-07-2019-0380>.
- [32] Perera, R. H. A. T., & Abeysekera, N. (2022). Factors affecting learners' perception of e-learning during the COVID-19 pandemic. *Asian association of open universities journal*, 17(1), 84-100. <https://doi.org/10.1108/AAOUJ-10-2021-0124>.
- [33] Pham, L. T., & Dau, T. K. T. (2022). Online learning readiness and online learning system success in Vietnamese higher education. *The International Journal of Information and Learning Technology*, 39(2), 147-165. <https://doi.org/10.1108/IJILT-03-2021-0044>.
- [34] Phutela, N., & Dwivedi, S. (2020). A qualitative study of students' perspective on e-learning adoption in India. *Journal of applied research in higher education*, 12(4), 545-559. <https://doi.org/10.1108/JARHE-02-2019-0041>.

- [35] Raza, S. A., Qazi, W., Khan, K. A., & Salam, J. (2021). Social isolation and acceptance of the learning management system (LMS) in the time of COVID-19 pandemic: an expansion of the UTAUT model. *Journal of Educational Computing Research*, 59(2), 183-208. <https://doi.org/10.1177/0735633120960421>.
- [36] Sharma, K., Deo, G., Timalisina, S., Joshi, A., Shrestha, N., & Neupane, H. C. (2020). Online learning in the face of COVID-19 pandemic: Assessment of students' satisfaction at Chitwan medical college of Nepal. *Kathmandu University Medical Journal*, 18(2), 40-47. <https://doi.org/10.3126/kumj.v18i2.32943>.
- [37] Sidharta, I. (2020). Learning Attitude: Student Perception on Pandemic Covid-19 in Bandung, Indonesia. *Jurnal Ekonomi, Bisnis & Entrepreneurship*, 14(2), 72-81. <https://doi.org/10.55208/cfddvr03>.
- [38] Singh, A., Sharma, S., & Paliwal, M. (2021). Adoption intention and effectiveness of digital collaboration platforms for online learning: the Indian students' perspective. *Interactive Technology and Smart Education*, 18(4), 493-514. <https://doi.org/10.1108/ITSE-05-2020-0070>.
- [39] Szopiński, T., & Bachnik, K. (2022). Student evaluation of online learning during the COVID-19 pandemic. *Technological forecasting and social change*, 174, 121203. <https://doi.org/10.1016/j.techfore.2021.121203>.
- [40] Tang, Y. M., Chen, P. C., Law, K. M., Wu, C. H., Lau, Y. Y., Guan, J., ... & Ho, G. T. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & education*, 168, 104211. <https://doi.org/10.1016/j.compedu.2021.104211>.
- [41] Tewari, A., Singh, R., Mathur, S., & Pande, S. (2023). A modified UTAUT framework to predict students' intention to adopt online learning: moderating role of openness to change. *The International Journal of Information and Learning Technology*, 40(2), 130-147. <https://doi.org/10.1108/IJILT-04-2022-0093>.
- [42] Ulla, M. B., & Perales, W. F. (2021). Facebook as an integrated online learning support application during the COVID19 pandemic: Thai university students' experiences and perspectives. *Heliyon*, 7(11). <https://doi.org/10.1016/j.heliyon.2021.e08317>.
- [43] Van De Werfhorst, H. G., Kessenich, E., & Geven, S. (2022). The digital divide in online education: Inequality in digital readiness of students and schools. *Computers and Education Open*, 3, 100100. <https://doi.org/10.1016/j.cao.2022.100100>.
- [44] Vikas, S., & Mathur, A. (2022). An empirical study of student perception towards pedagogy, teaching style and effectiveness of online classes. *Education and Information Technologies*, 1-22. <https://doi.org/10.1007/s10639-021-10793-9>.
- [45] Wang, Y. S. (2003). Assessment of learner satisfaction with asynchronous electronic learning systems. *Information & management*, 41(1), 75-86. [https://doi.org/10.1016/S0378-7206\(03\)00028-4](https://doi.org/10.1016/S0378-7206(03)00028-4).
- [46] Yunusa, A. A., & Umar, I. N. (2021). A scoping review of critical predictive factors (CPFs) of satisfaction and perceived learning outcomes in E-learning environments. *Education and Information Technologies*, 26(1), 1223-1270. <https://doi.org/10.1007/s10639-020-10286-1>.