JOURNAL OF POLITICAL STABILITY ARCHIVE

Online ISSN: 3006-5879 Print ISSN: 3006-5860
DOI: https://doi.org/10.63468/jpsa.4.1.32
Vol. 4 No. 1 (2026)
https://journalpsa.com.pk/index.php/JPSA/about

Recognized by: Higher Education Commission (HEC), Government of Pakistan

The Mediating Role of Perceived Usefulness and Perceived Ease of Use in E-Learning Adoption During COVID-19 in Pakistan

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ABSTRACT

The proposed study explores the determinants of e-learning use in Pakistan during COVID-19 and examines the mediating effects of Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Also based on the prolonged Technology Acceptance Model (TAM), the study adds external variables of other significant theories, such as Cost, System Quality, and Complexity. A total of 461 students were sampled from major Pakistani universities using a structured questionnaire. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to analyse the data using SmartPLS software. The results demonstrate that PU and PEOU are essential mediators between several external variables and Behavioural Intention (BI). In particular, PEOU completely mediates the relationship between Application Complexity and PU and partially mediates the effects of Facilitating Conditions and COVID-19 on PU. Furthermore, PU mediates the relationships between Social Influence, PEOU, and BI. Moreover, PU mediates between Social Influence, PEOU, and BI. This research validates the essential mediating processes

of the TAM model and provides valuable information for stakeholders interested in improving e-learning adoption during the crisis.
Keywords: E-learning, COVID-19, Technology Acceptance Model (TAM), Mediation Analysis, Perceived Usefulness, Perceived Ease of Use, Pakistan, PLS-SEM.

INTRODUCTION

The outbreak of the COVID-19 pandemic in 2019 has disrupted all economic sectors, with education among the most affected. The forced social distancing initiatives were an unpleasant shock to educational institutions around the globe, as they had to halt face-to-face learning. During this crisis, e-learning became not just an educational supplement but a necessity to maintain educational continuity (Dhawan, 2020; Toquero, 2020). E-learning, defined as learning facilitated by electronic tools and online platforms, is a promising alternative that enables remote teaching and learning in the face of geographical and temporal limitations on learning (Liaw, 2008; Alonso et al., 2005).

Although it was a worldwide trend, the transition to online education was much more successful and efficient in developed countries compared to developing ones. Those nations that had a solid digital infrastructure and a prior background in online education adapted more easily. Conversely, developing nations, such as Pakistan, had to contend with an overwhelming array of socioeconomic and technological obstacles that severely impeded this transition (Adnan & Anwar, 2020; Rehman, 2021). The implementation of e-learning in Pakistan was a slow process even before the pandemic since there has been a long-standing problem in the country of unstable electricity, unreliable internet access, and poor access to digital devices, not to mention the deficiency of digital literacy among teachers and learners (Majoka et al., 2013; Arshad et al., 2017; Noreen et al., 2016).

The sudden requirement to go nationwide with e-learning during the lockdown revealed and exacerbated these latent shortcomings. The prohibitive nature of the data and devices, the complexity of the new software platforms, the variability of system quality, and the need to ensure the stability of electricity and internet connectivity were major challenges for both students and educators. Moreover, the pandemic increased anxiety and stress and imposed lockdown restrictions, making the problem of student motivation and its social impact even more topical (Abbas et al., 2022; Kapasia et al., 2020; Raza et al., 2021).

Significant literature has been conducted regarding technology adoption relying on the developed models such as the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT), and the Innovation Diffusion Theory (IDT) (Davis, 1989; Venkatesh et al., 2003; Rogers, 1995). However, the situation of e-learning adoption being mandatory and a crisis due to a global health crisis fundamentally differs from the voluntary adoption contexts to which these models were initially developed. Thus, one model is inadequate to describe the complex barriers to adoption in this unique scenario.

The research gap is to develop and test an integrated research model to identify the most important variables affecting behavioural intention to use e-learning, specifically during the COVID-19 pandemic in Pakistan. The Delone and McLean IS Success Model, UTAUT, and TAM together created constructs that were synthesised to develop unique external variables in the research: Perceived Cost, System Quality, Complexity, Facilitating Conditions, Social Influence, COVID-19 Impact (lockdown, fear, stress), and Student Learning Motivation.

The COVID-19 outbreak has introduced an unprecedented global disruption to learning via online media and has posed particular challenges, particularly in developing nations such as Pakistan. It is essential to understand the determinants of e-learning adoption in this context. Technology Acceptance Model (TAM) remains a robust framework in this regard, with Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) as the two central ones mediating. In this paper, the mediation analysis from a larger study has been extracted and elaborated to explain the indirect mechanism by which external variables shape students' intention to use e-learning.

The results of this research will be beneficial to policymakers, administrators of educational institutions, and technology providers in Pakistan and other developing countries. Knowledge of these determinants is essential for designing sustainable strategies, allocating resources effectively, and creating more resilient e-learning systems capable of enduring future disruptions, which can help sustain education in the face of crises.

LITERATURE REVIEW

E-Learning and Its Imperative During COVID-19

E-learning, which refers to a learning event supported by electronic devices and web-based applications, will enable learning at any scale, geographically and temporally (Liaw, 2008; Alonso, López, Manrique, & Viñes, 2005). The COVID-19 pandemic catalyzed a worldwide, forced transition to e-learning. As the process of social distancing necessitated shutting down educational establishments, e-learning became not an addition but a necessity to maintain educational continuity. (Dhawan, 2020; Toquero, 2020; Bukhari, 2025). This abrupt change was not the same everywhere. In developed countries with a solid digital foundation, institutions responded more fluidly, but in poorer nations such as Pakistan, a wide range of existing and emerging challenges were significant barriers to the transition and made the process quite difficult (Adnan & Anwar, 2020; Rehman, 2021; Hamid, 2025).

Theoretical Foundations: Technology Adoption Models

The available research on the topic of technology adoption is extensive, and it is based on well-developed theoretical models. At the top of this list is the Technology Acceptance Model (TAM), which argues that Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) are key factors that influence Behavioural Intention (BI) of a user to use a technology, which leads to actual use (Davis, 1989). The model has a parsimonious and empirically sound nature, making it a suitable underlay construct in e-learning research (Venkatesh and Davis, 2000).

The vast study on technology adoption is based on thoroughly developed theoretical models. The most used model is the Technology Acceptance Model (TAM).

Other pivotal models include the Unified Theory of Acceptance and Use of Technology (UTAUT), which focuses on expectations of Performance, Effort, Social Influence, and Facilitating Conditions (Bukhari et al., 2024; Venkatesh et al., 2003); the Innovation Diffusion Theory (IDT), which focuses on complexity and relative advantage (Rogers, 1995); and the DeLone and McLean IS Success Model, which focuses on system and information quality (DeLone and McLean, 2003; Bukhari et al., 2025).

The Technology Acceptance Model holds that Perceived Usefulness and Perceived Ease of Use are critical factors influencing a user's intention to use technology, which, in turn, results in actual use (Davis, 1989). It is quite sparse and empirically valid such that it makes it an appropriate foundational framework of e-learning research (Venkatesh and Davis, 2000; Bukhari, 2024).

The major drawback of using a single model is that it cannot explain the full variance in user intention, generally accounting for about 40% of it (Venkatesh et al., 2003). This is especially so in distinctive, mandatory situations, such as the transition to e-learning that occurred during the pandemic, in contrast to the voluntary adoption environment in which these models were created. Therefore, researchers generally suggest adding TAM constructs to those of other models to increase TAM's explanatory strength (Mailizar & Burg, 2021; Al-Maroor et al., 2021; Wang & Barnes, 2007).

External Antecedents and the Mediating Role of TAM Constructs

The fundamental concept of technology adoption research is that there are extrinsic factors which have an indirect effect on BI via the mediating constructs of PU and PEOU (Davis, 1989). According to the literature, there are a few major external factors that apply to the Pakistani context:

- **System Quality (SQ):** Based on reliability, availability, and response time, SQ is a pillar of the Delone and McLean model. Research indicates that a stable and high-quality system directly improves how users perceive the usefulness of a system and how much they are willing to use it, as well as the effort to use it, which in turn raises PEOU (Alkhawaja et al., 2021; Jaber, 2016; Ghazal et al., 2017).

Hypothesized Mediating Path: SQ → PU/PEOU → BI

- **Complexity (CO):** Complexity, in its turn, is also based on the construct of IDT, and it can be explained as the degree to which an innovation is perceived as hard to utilize. Theoretically, it is the opposite of the perceived ease of use (PEOU). Empirical studies all show that perceived complexity has a significant negative impact on PEOU which in turn has an impact on the perceived usefulness (PU) and behavioral intention (BI) (Lee et al., 2011; Shih et al., 2007; Hardgrave et al., 2003).

Hypothesized Mediating Path: CO → PEOU → PU → BI

- **Social Influence (SI):** One of the critical UTAUT constructs, SI indicates the influence of the perceptions of friends, relatives, and significant others. Social pressure and norms are likely to influence a person's belief in a collective society, such as Pakistan, that using a system will be helpful (proper) and their intention to use it (Hamid & Abbas, 2025; Khalifa, 2008; Wei et al., 2009).

Hypothesized Mediating Path: SI → PU → BI

- **Facilitating Conditions (FC):** FC is also a UTAUT attribute that relates to the user having the belief that there is an organizational and technical infrastructure to support the use of a system. Access to resources such as stable internet, electricity, and training has a direct negative impact on perceived effort when using e-learning systems, thereby reinforcing PEOU (Venkatesh et al., 2003; Jameel et al., 2020; Shah et al., 2025).

Hypothesized Mediating Path: FC → PEOU → PU → BI

- **COVID-19 Impact (CVD):** This distinctive external variable includes lockdown restrictions, financial pressures and fear. According to research, these pandemic-induced stressors may foster an adverse psychological state that reduces the user's perception of system usefulness and ease of use, thereby serving as an adoption barrier (Kapasia et al., 2020; Roman et al., 2021; Hsu & Huynh, 2023).

Hypothesized Mediating Path: CVD → PU/PEOU → BI

- **Cost (CS):** The cost of devices and data packages is a serious hurdle in the case of an emerging economy. Perceived cost is theorized to have a direct negative effect on BI since it is a tangible barrier to access, and may have a negative effect on PU where the perceived cost exceeds the perceived benefits (Sarosa, 2021; Asvial et al., 2021; Masih et al., 2025).
- **Student Learning Motivation (SLM):** One of the driving factors of learning is motivation. Intrinsic and extrinsic motivators can directly stimulate a student's intention to use technology in the e-learning context, perhaps overriding cognitive assessments of PU and PEOU (Pintrich & Schunk, 2002; Dörnyei, 2010; Iqbal et al., 2021).

Conclusion and Research Gap

Although prior literature has explored the adoption of e-learning, the reality of its being mandatory, and in case of emergency, when the world faces COVID-19, is a different situation. This transition in Pakistan occurred against a backdrop of significant pre-existing infrastructure and socioeconomic issues. Although the individual barriers are familiar, there is no cohesive model that jointly considers the direct impact of such vital, context-based external factors and, most importantly, their indirect impact, moderated via the predetermined cognitive processes of PU and PEOU. The proposed research will address this gap by developing and testing an extensive research model, an extension of TAM. It incorporates external constructs from UTAUT, IDT, and the D&M model to determine how behavioural intention to adopt e-learning in Pakistan is directly and indirectly influenced during the COVID-19 pandemic.

Theoretical Framework and Hypotheses

The proposed research model (see Figure 1) suggests that perceived usefulness (PU) and perceived ease of use (PEOU) are medium of intermediation between external situational factors and behavioural intention (BI) construct. The direct hypotheses are presented in the study (e.g., H1: PU → BI; H2a: PEOU → BI; H2b: PEOU → PU). The mediation analysis tests the following indirect paths:

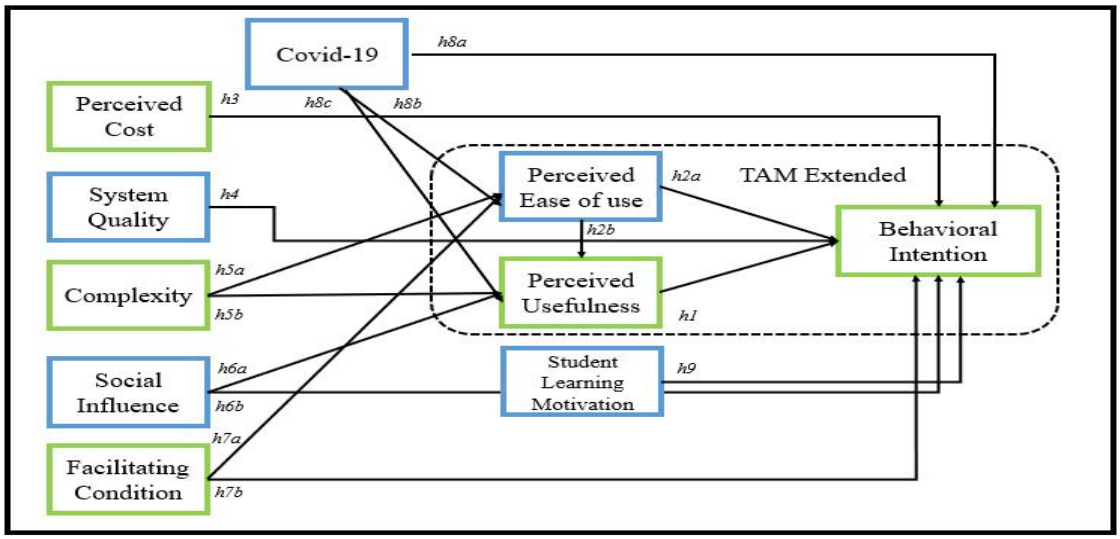

Figure 1: Research Model

- **H-Med1:** Application Complexity → PEOU → PU
- **H-Med2:** Facilitating Conditions → PEOU → PU
- **H-Med3:** COVID-19 → PEOU → PU
- **H-Med4:** Social Influence → PU → BI
- **H-Med5:** PEOU → PU → BI

METHODOLOGY

Data Collection and Sample:

The survey was quantitative and was sent to university students in Pakistan who had undergone e-learning during the COVID-19 lockdowns. Cluster sampling was employed across four provinces (Punjab, Sindh, Khyber Pakhtunkhwa, and Baluchistan). From 567 initial responses, 461 valid responses were retained for analysis after screening for biases and missing data.

Measures:

Multi-item scales based on published literature were used to operationalise all constructs, with the answers to be captured using a 7-point Likert scale between 1 (Strongly Disagree) and 7(Strongly Agree). The reliability and validity of each scale were assessed before testing the structural model, with Cronbach's alpha coefficients above 0.70, composite reliability above 0.70, and average values extracted above 0.50.

Data Analysis:

The mediation analysis was conducted using SmartPLS 4.0.9.2. The significance of the indirect effects was assessed using the bootstrapping procedure with 5,000 subsamples to generate t-statistics and confidence intervals.

RESULTS

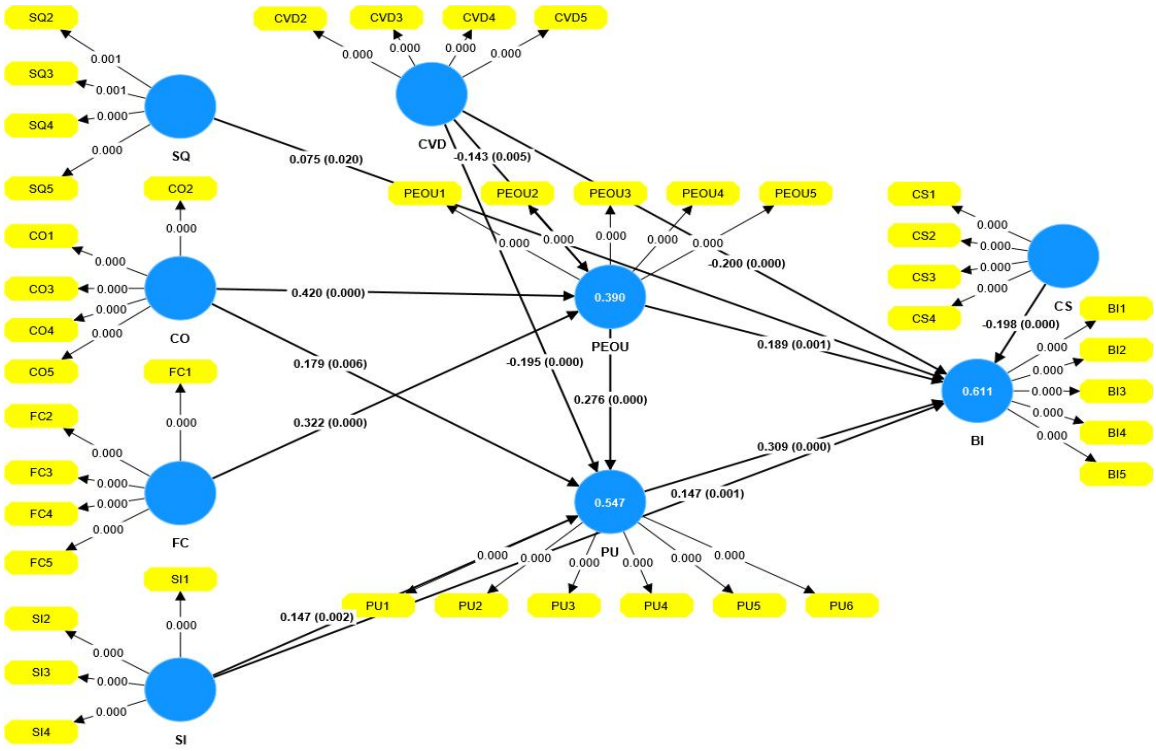

Figure 2: Mediation analysis

Figure 1 above shows that the structural model results have significant explanatory power for behavioural intention to embrace e-learning. The model explains the 39.0 per cent of the variance in Perceived Ease of Use (PEOU), 54.7 per cent in Perceived Usefulness (PU) and 61.1 per cent in Behavioural Intention (BI), which means that it has a moderate to large predictive accuracy. The quality of the content (CO), facilitating conditions (FC), and quality system (SQ) have a positive impact on PEOU with a significant influence, but the difficulties caused by the COVID-19 (CVD) have the negative impact. Therefore, PEOU significantly influences PU, supporting the Technology Acceptance Model's assumption that perceived usefulness is improved by ease of use. PEU, as well as PU, show considerable positive effects on BI, although PU is the strongest predictor of behavioural intention, highlighting its central role in the adoption of e-learning.

Mediation analysis reveals that PEOU and PU serve as key mediating mechanisms between external variables and behavioral intention. The effects of CO, FC, and SQ on BI are transmitted indirectly through PEOU and PU, indicating complete mediation in the absence of direct paths to BI. Moreover, a serial mediation effect is established, whereby external factors influence BI through PEOU and subsequently PU, underscoring the sequential nature of technology acceptance. Conversely, COVID-related difficulties indirectly affect BI by reducing both PEOU and PU, demonstrating an adverse mediated effect on e-learning adoption. Overall, these findings confirm the pivotal mediating role of PEOU and PU in explaining how external and contextual factors shape users' behavioural intention to adopt e-

learning systems. Moreover, the results of the mediation analysis are also summarized in the following table 1:

Hypothesized Mediation Path	Std. Beta (β)	t-statistics	p-values	95% CI (LL, UL)	Supported ?
CO -> PEOU -> PU	0.183	5.181	0	[0.116, 0.255]	**Yes (Full)**
FC -> PEOU -> PU	0.086	3.059	0.002	[0.033, 0.144]	**Yes (Partial)**
CVD -> PEOU -> PU	-0.087	3.355	0.001	[-0.139, -0.041]	**Yes (Partial)**
SI -> PU -> BI	0.097	3.616	0	[0.047, 0.153]	**Yes (Partial)**
PEOU -> PU -> BI	0.342	9.483	0	[0.270, 0.413]	**Yes (Partial)**

Table 1: Summarized Results

Key Findings:

1. **PEOU is a full mediator** between Application Complexity (CO) and Perceived Usefulness (PU). The complexity of an e-learning application does not directly make it worthwhile; instead, it must first be perceived as easy to use, which then leads to the perception of usefulness.
2. **PEOU is a partial mediator** for Facilitating Conditions (FC) and COVID-19 (CVD). While FC (e.g., internet, power) directly influences PU, part of its effect is channelled through making the system easier to use. Similarly, the stressors of COVID-19 negatively impact PU both directly and indirectly by making systems more complicated to use.
3. **PU is a partial mediator** between Social Influence (SI) and Behavioral Intention (BI). Encouragement from peers and family (SI) increases adoption intention (BI) not only directly but also by enhancing perceived system usefulness.
4. **PU is a partial mediator** between PEOU and BI. The ease of use of a system (PEOU) leads to adoption intention (BI) both directly and indirectly, by first increasing perceived usefulness.

DISCUSSION AND IMPLICATIONS

This mediation analysis offers an insightful perspective on the nature and effect of some factors on e-learning adoption. The findings indicate strong support for the TAM theoretical framework and the critical roles of PU and PEOU as mediating variables.

Theoretical Implications: The research confirms the extended TAM model in the specific environment of a pandemic in a developing nation. It shows that the influence of severe environmental and system-related factors (such as complexity,

infrastructure, and a global crisis) is strongly mediated by users' cognitive beliefs about the usefulness and ease of use.

Practical Implications:

- **For Developers:** To improve PU, emphasis should be on PEOU. The most significant factor is designing simple, intuitive, and user-friendly e-learning applications, because perceived usefulness is contingent on ease of use.
- **For Institutions and Policymakers:** It is essential to invest in Facilitating Conditions (good internet, power infrastructure). This investment is positive in itself and, indirectly, enhances results by simplifying e-learning platforms. In addition, any measures that would reduce the adverse psychological impact of circumstances such as COVID-19 (e.g., counselling, flexible deadlines) may assist in enhancing both PEOU and PU.
- **For Educators:** Another potentially effective strategy involves using Social Influence in the form of positive word-of-mouth and testimonials, since this increases direct perception and perceived usefulness of e-learning systems.

CONCLUSION

This study has identified the mediating mechanisms of the Technology Acceptance Model in the context of adopting e-learning during a crisis. The results show that Perceived Usefulness and Perceived Ease of Use are direct predictors as well as intermediary mechanisms whereby the external variables influence behavioural intention. In a bid to ensure the successful execution of e-learning projects in the intricate environment of Pakistan, there is a need to develop interventions that have a favorable impact on these fundamental mediating beliefs.

REFERENCES

Abbas, J., Aman, J., Nurunnabi, M., & Bano, S. (2022). The impact of social media on learning behavior for sustainable education: Evidence of students from selected universities in Pakistan. Sustainability, 14(3), 1554. (or as cited in the thesis literature review).

Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. Journal of Pedagogical Sociology and Psychology, 2(1), 45-51.

Alkhawaja, M. I., Halim, M. S. A., Abumandil, M. S., & Al-Adwan, A. S. (2021). System quality and student's acceptance of the e-learning system: A meta-analysis. Journal of Educational Computing Research.

Al-Maroor, R. S., Salloum, S. A., Shaalan, K., & Tarhini, A. (2021). Factors affecting the E-learning acceptance: A case study from UAE. Education and Information Technologies, 26(1), 1-23.

Alonso, F., López, G., Manrique, D., & Viñes, J. M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. British Journal of Educational Technology, 36(2), 217–235.

Arshad, M., Akram, M. S., & Mahmood, A. (2017). Availability and problems relating to the accessibility of information and communication technologies (ICTs) among university students. Pakistan Journal of Information Management and Libraries, 19, 1-15.

Asvial, M., Mayangsari, J., & Yudistriansyah, A. (2021). Behavioral intention of e-learning: A case study of distance learning at a junior high school in Indonesia due to the COVID-19 pandemic. International Journal of Technology, 12(5), 965-975.

Bukhari, S. R. H. (2024). Navigating the Digital Divide: The Strategic Implications of Social Media in Future Conflicts Between India and Pakistan. Spry Contemporary Educational Practices, 3(1).

Bukhari, S. R. H. (2025). Between Regionalism and Globalism: Exploring the Contemporary and Prospects of Syria in the Middle Eastern Polity. International Social Research Nexus (ISRN), 1(1), 1-17.

Bukhari, S. R. H., Ali, S., & Haq, I. U. (2025). Realigning Alliances in South Asia: Exploring the Dynamics of Pakistan-Bangladesh Relations in a Post-Hasina Era. Journal of Regional Studies Review, 4(1), 94-109.

Bukhari, S. R. H., Khan, A. U., Noreen, S., Khan, M. T. U., Khan, M. N., & Haq, M. I. U. (2024). Silenced voices, unheeded pleas: The plight of Palestinian human rights under the shadow of Israeli occupation. Remittances Review, 9(1), 2240-2276.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3), 319–340.

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Management Information Systems, 19(4), 9-30.

Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. Journal of Educational Technology Systems, 49(1), 5–22.

Dörnyei, Z. (2010). The relationship between language aptitude and language learning motivation. In E. Macaro (Ed.), The Continuum companion to second language acquisition (pp. 247-267). Continuum.

Ghazal, S., Al-Samarraie, H., & Aldowah, H. (2017). "I am still learning": Modelling LMS critical success factors for promoting students' experience and satisfaction in a blended learning environment. IEEE Access, 6, 77179-77201.

Hamid, S. (2025). A Critical Review of Educational Research Methodologies: Approaches, Applications, and Implications. Pakistan Social Sciences Review, 9(2), 138-150.

Hamid, S., & Abbas, S. (2025). Artificial intelligence as a pedagogical scaffold in K–12 language and literacy education. Annals of Human and Social Sciences, 6(4), 41–56.

Hardgrave, B. C., Davis, F. D., & Riemenschneider, C. K. (2003). Investigating determinants of software developers' intentions to follow methodologies. Journal of Management Information Systems, 20(1), 123-151.

Hsu, W. K., & Huynh, N. T. (2023). An evaluation of productive efficiency for container terminals affiliated to a single organisation. Journal of Transport Economics and Policy (JTEP), 57(1), 59-76.

Iqbal, U. B., Sarmad, M., Hussain, S., & Jalil, A. (2021). Analyzing Project Organizational Culture through Workplace Incivility and Ostracism under Mediating and Moderating Mechanisms. Ilkogretim Online, 20(4).

Jaber, O. A. (2016). The impact of system quality and information quality on the acceptance of the learning management system. International Journal of Advanced Computer Science and Applications, 7(11), 490-494.

Jameel, A. S., Abdallah, A. K., & Mohammed, A. K. (2020). The impact of facilitating conditions on the intention to use e-learning among university students. International Journal of Emerging Technologies in Learning, 15(18), 207-221.

Kapasia, N., Paul, P., Roy, A., Saha, J., Zaveri, A., Mallick, R., ... & Chouhan, P. (2020). Impact of lockdown on learning status of undergraduate and postgraduate students during COVID-19 pandemic in West Bengal, India. Children and Youth Services Review, 116, 105194.

Khalifa, M. (2008). Social influence on knowledge sharing. In Knowledge management: Concepts, methodologies, tools and applications (pp. 1326-1343). IGI Global.

Lee, Y.-H., Hsieh, Y.-C., & Chen, Y.-H. (2011). An investigation of the antecedents of behavioral intention to use e-learning. Journal of Educational Computing Research, 44(2), 217-244.

Liaw, S.-S. (2008). Investigating students' perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the Blackboard system. Computers & Education, 51(2), 864–873.

Mailizar, M., & Burg, D. (2021). Examining the factors influencing teachers' intention to use e-learning in Indonesian secondary schools. International Journal of Information and Education Technology, 11(5), 231-236.

Majoka, M. I., Fazal, S., & Khan, M. I. (2013). Implementation of Information and Communication Technologies (ICTs) in Education Course. Journal of Research & Reflections in Education, 7(2), 132-144.

Masih, S., Kumar, V., Tan Huynh, N., Anh Kiet, V., & Thi Thom, N. (2025). Bridging the AI learning anxiety and employees' extra-role behavior: An LMX perspective. EDPACS, 1-15.

Noreen, R., Rana, T., & Raza, S. H. (2016). Challenges of digital learning for distance universities of Pakistan. Journal of Research in Social Sciences, 4(2), 106-120.

Pintrich, P. R., & Schunk, D. H. (2002). Motivation in education: Theory, research, and applications (2nd ed.). Merrill Prentice Hall.

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.

Rehman, Z. U. (2021). Student Experiences of ICTs in Online Learning during COVID-19 in Pakistan. Global Regional Review, VI(I), 70-80.

Rogers, E. M. (1995). Diffusion of Innovations (4th ed.). The Free Press.

Roman, M., Plopeanu, A. P., & Radu, C. M. (2021). The impact of the COVID-19 pandemic on the educational process: The case of higher education. Sustainability, 13(6), 3156.

Sarosa, S. (2021). The effect of perceived cost on the intention to use e-learning: An empirical study. Journal of Education and e-Learning Research, 8(1), 142-147.

Shah, S. M. A., Ahmed, N., Haq, A. U., & Saba, S. (2025). Leadership for Innovation: Fostering the Culture of Creativity in Organization: A Systematic Literature Review. Journal of Asian Development Studies, 14(2), 945-957.

Shih, Y.-Y., & Huang, S.-S. (2007). The actual usage of ERP systems: An extended technology acceptance perspective. Journal of Research and Practice in Information Technology, 39(3), 263-276.

Toquero, C. M. (2020). Challenges and Opportunities for Higher Education Amid the COVID-19 Pandemic: The Philippine Context. Pedagogical Research, 5(4), em0063.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2), 186-204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. MIS Quarterly, 27(3), 425–478.

Wang, Y.-S., & Barnes, S. J. (2007). Exploring the factors influencing the adoption of mobile computing. Journal of Information Technology Theory and Application, 8(3), 21-37.

Wei, T.-T., Marthandan, G., Chong, A. Y.-L., Ooi, K.-B., & Arumugam, S. (2009). What drives Malaysian m-commerce adoption? An empirical analysis. Industrial Management & Data Systems, 109(3), 370-388.