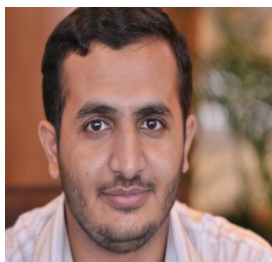


- [46] M. Paechter, B. Maier, and D. Macher, "Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction," *Comput. Educ.*, vol. 54, no. 1, pp. 222–229, 2010.
- [47] K. Franceschi, R. M. Lee, S. H. Zanakis, and D. Hinds, "Engaging group e-learning in virtual worlds," *J. Manag. Inf. Syst.*, vol. 26, no. 1, pp. 73–100, 2009.
- [48] S. Ghazinoory and M. Afshari-Mofrad, "Ranking different factors which affect E-Learning outcomes," *Int. J. Comput. Theory Eng.*, vol. 4, no. 2, p. 234, 2012.
- [49] C. Kim and R. Santiago, "Construction of E-Learning Environments in Korea," *Educ. Technol. Res. Dev.*, vol. 53, no. 4, pp. 108–115, Apr. 2005, [Online]. Available: <http://www.jstor.org/stable/30221214>.
- [50] B.-C. Lee, J.-O. Yoon, and I. Lee, "Learners' acceptance of e-learning in South Korea: Theories and results," *Comput. Educ.*, vol. 53, no. 4, pp. 1320–1329, 2009, doi: <https://doi.org/10.1016/j.compedu.2009.06.014>.
- [51] J. J. Baroudi and W. J. Orlikowski, "The Problem of Statistical Power in MIS Research," *MIS Q.*, vol. 13, no. 1, pp. 87–106, Apr. 1989, doi: 10.2307/248704.
- [52] H. M. Abu-Dalbouh, "A questionnaire approach based on the technology acceptance model for mobile tracking on patient progress applications," *J. Comput. Sci.*, vol. 9, no. 6, pp. 763–770, 2013.
- [53] H. Coates, "A model of online and general campus-based student engagement," *Assess. Eval. High. Educ.*, vol. 32, no. 2, pp. 121–141, 2007.
- [54] S. Hrastinski, "A theory of online learning as online participation," *Comput. Educ.*, vol. 52, no. 1, pp. 78–82, 2009.
- [55] M. Tschandl, B. Mayer, and S. R. Sorko, "An interdisciplinary digital learning and research factory: The Smart Production Lab," *Procedia Manuf.*, vol. 45, pp. 491–496, 2020.
- [56] H. S. Aldosari and M. A. A. Mekheimer, "The Bandwagon Effect in the Adoption of ELearning Systems in Language Learning—An Appraisal," *GSTF J. Comput.*, vol. 2, no. 4, 2014.
- [57] B. A. Eldridge, "Exploring faculty adoption and utilization of Blackboard at a community college in the Kentucky community and technical college system.(3691866), University of Kentucky," ProQuest Diss. Theses Glob. database, 2014.
- [58] H. M. Abu-Dalbouh, "An Integrated Expert User with End User in Technology Acceptance Model for Actual Evaluation.," *Comput. Inf. Sci.*, vol. 9, no. 1, pp. 47–53, 2016.
- [59] H. Abu-Dalbouh et al., "A proposed website to evaluate the academic performance in college of sciences and arts in unaizah," *Res. J. Appl. Sci. Eng. Technol.*, vol. 11, no. 12, pp. 1305–1319, 2015.
- [60] J. Poon, "Blended learning: An institutional approach for enhancing students' learning experiences," *J. online Learn. Teach.*, vol. 9, no. 2, pp. 271–288, 2013.
- [61] M.-H. Lin and H. Chen, "A study of the effects of digital learning on learning motivation and learning outcome," *Eurasia J. Math. Sci. Technol. Educ.*, vol. 13, no. 7, pp. 3553–3564, 2017.
- [62] S. Al-Fadhli, "Students' Perceptions of E-learning in Arab Society: Kuwait University as a case study," *E-Learning Digit. media*, vol. 5, no. 4, pp. 418–428, 2008.
- [63] R. Ayres, "Learner attitudes towards the use of CALL," *Comput. Assist. Lang. Learn.*, vol. 15, no. 3, pp. 241–249, 2002.
- [64] A. Bacher-Hicks, J. Goodman, and C. Mulhern, "Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time," *J. Public Econ.*, vol. 193, p. 104345, 2021.
- [65] H. Coates, R. James, and G. Baldwin, "A critical examination of the effects of learning management systems on university teaching and learning," *Tert. Educ. Manag.*, vol. 11, pp. 19–36, 2005.
- [66] M. Mahyoob, "Challenges of e-Learning during the COVID-19 Pandemic Experienced by EFL Learners," *Arab World English J.*, vol. 11, no. 4, 2020.
- [67] B. J. L. Landry, R. Griffith, and S. Hartman, "Measuring student perceptions of blackboard using the technology acceptance model," *Decis. Sci. J. Innov. Educ.*, vol. 4, no. 1, pp. 87–99, 2006.
- [68] H. M. ABU-DALBOUH and S. A. ALATEYAH, "Predictive data mining rule-based classifiers model for novel coronavirus (COVID-19) infected patients' recovery in the Kingdom of Saudi Arabia," *J. Theor. Appl. Inf. Technol.*, vol. 99, no. 8, 2021.
- [69] X. Xie, K. Siau, and F. F.-H. Nah, "COVID-19 pandemic—online education in the new normal and the next normal," *J. Inf. Technol. case Appl. Res.*, vol. 22, no. 3, pp. 175–187, 2020.

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