



Global Journal of Advanced
Research and Reviews

Journal homepage: <https://gsjournals.com/gjarr/>

ISSN: 2980-423X (Online)



(REVIEW ARTICLE)



DIGITAL TRANSFORMATION IN HIGHER EDUCATION: A SYSTEMATIC REVIEW OF E-LEARNING ADOPTION AND INSTITUTIONAL CHANGE

Dewa K. Suhartono *

Department of Information Systems, School of Computer Science, Universitas Katolik Soegijapranata, Semarang, Central Java, Indonesia.

* Corresponding Author

Global Journal of Advanced Research and Reviews, 2026, 04(01), 001–006

Publication history: Received on 02 January 2026; revised on 26 January 2026; accepted on 28 January 2026

Article DOI: <https://doi.org/10.58175/gjarr.2026.4.1.0008>

Copyright © 2026 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution License 4.0

ABSTRACT

Digital transformation has fundamentally reshaped higher education, with e-learning emerging as a critical component of institutional strategy and pedagogical practice. This systematic review synthesizes the existing literature on digital transformation in higher education, focusing on e-learning adoption, institutional change processes, and the factors that influence successful implementation. The review examines studies published between 2017 and 2024, identifying key themes including factors influencing e-learning adoption, institutional challenges, pedagogical implications, and the impact of external disruptions such as the COVID-19 pandemic. Findings indicate that perceived ease of use, usefulness, learner attitude, self-efficacy, and facilitating conditions are critical determinants of e-learning adoption. Institutional challenges include infrastructure limitations, faculty resistance, digital literacy gaps, and the need for supportive policies and leadership. The review highlights the importance of student-centered learning approaches, the integration of emerging technologies, and the development of institutional capabilities for sustainable digital transformation. This paper contributes to the literature by providing a comprehensive overview of e-learning adoption in higher education and identifying promising avenues for future research.

Keywords: Digital Transformation, Higher Education, E-Learning, Technology Adoption, Institutional Change, Online Learning

1 INTRODUCTION

Digital transformation has become an imperative for higher education institutions worldwide, driven by technological advances, changing student expectations, and the need for more flexible and accessible educational delivery. Data-driven practices are now crucial in the digital age for streamlining operations and boosting output across a range of industries, and higher education institutions are adopting this trend with e-learning emerging as a cutting-edge and promising strategy to improve educational delivery and student engagement (Shard & Koul, 2024). Despite the potential advantages, e-learning adoption in higher education remains a developing topic with challenges that require systematic investigation.

The COVID-19 pandemic accelerated the adoption of digital technologies in higher education, forcing institutions to rapidly transition to online and hybrid learning models. This unprecedented disruption revealed both the potential and

the limitations of existing digital infrastructure and capabilities, highlighting the need for more strategic and sustainable approaches to digital transformation. The pandemic also exposed significant inequities in access to technology and digital literacy, raising important questions about inclusivity and the digital divide. Hodges, Moore, Lockee, Trust, and Bond (2020) provided an early analysis of the pandemic's impact on higher education, examining the distinctions between emergency remote teaching and planned online learning.

Digital transformation in higher education extends beyond the mere adoption of technology to encompass fundamental changes in institutional strategy, organizational culture, pedagogical approaches, and stakeholder relationships. Effective digital transformation requires alignment between technological capabilities, institutional goals, and the needs of diverse stakeholders including students, faculty, administrators, and employers. This review synthesizes the existing literature on digital transformation in higher education, with a particular focus on e-learning adoption and institutional change processes.

The significance of this review lies in its comprehensive examination of the factors that influence e-learning adoption, the challenges institutions face in implementing digital transformation, and the strategies that enable successful change. By integrating findings from multiple studies, this paper provides insights for policymakers, institutional leaders, and educators seeking to navigate the complexities of digital transformation in higher education. The review draws on the work of Garrison and Vaughan (2008) on blended learning in higher education, and the comprehensive framework for online learning developed by Anderson (2008).

2 FACTORS INFLUENCING E-LEARNING ADOPTION

2.1 Technology Acceptance Models

The Technology Acceptance Model and its extensions have been widely applied to understand e-learning adoption in higher education. Key constructs include perceived ease of use, perceived usefulness, attitude toward using, and behavioral intention to use. Research consistently demonstrates that these factors significantly influence students' and faculty members' acceptance of e-learning technologies. Perceived ease of use refers to the degree to which individuals believe that using a particular technology would be free of effort, while perceived usefulness reflects the belief that using the technology would enhance performance. Davis (1989) introduced the Technology Acceptance Model, which has been extended and validated in numerous educational contexts. Venkatesh, Morris, Davis, and Davis (2003) developed the Unified Theory of Acceptance and Use of Technology, which has been widely applied to e-learning contexts. Studies by Abdullah and Ward (2016) and Al-Emran, Mezhyuev, and Kamaludin (2018) have synthesized research on technology acceptance in educational settings.

2.2 Individual Factors

Individual characteristics play a significant role in e-learning adoption. Learner attitude toward technology, self-efficacy, computer anxiety, and prior experience with digital tools influence adoption decisions. Students with higher self-efficacy and more positive attitudes toward technology are more likely to embrace e-learning. Similarly, faculty members' confidence in their digital skills and their beliefs about the pedagogical value of e-learning affect their willingness to adopt and integrate technology into their teaching. Bandura (1997) provided foundational work on self-efficacy, which has been applied to educational technology contexts by researchers including Compeau and Higgins (1995) and Marakas, Yi, and Johnson (1998).

2.3 Contextual Factors

Contextual factors including institutional support, infrastructure availability, and facilitating conditions significantly influence e-learning adoption. Adequate technical support, reliable infrastructure, and access to appropriate devices and connectivity are essential for successful implementation. Institutional policies, leadership commitment, and a supportive organizational culture also play crucial roles in enabling e-learning adoption. Hall and Hord (2015) provided a comprehensive framework for understanding change in educational contexts, while Rogers (2003) articulated the diffusion of innovations theory that has been widely applied to technology adoption in education.

2.4 Social Factors

Social influences, including peer recommendations, subjective norms, and social presence, affect e-learning adoption. Students and faculty members are influenced by the attitudes and behaviors of their peers, and the perception that e-learning is valued by the institution and the broader academic community can encourage adoption. Social presence in online learning environments also affects student engagement and satisfaction. Garrison, Anderson, and Archer (2000) developed the Community of Inquiry framework, which has been extensively used to examine social presence and interaction in online learning environments.

3 INSTITUTIONAL CHALLENGES IN DIGITAL TRANSFORMATION

3.1 Infrastructure and Resource Constraints

Many higher education institutions face significant infrastructure challenges, including inadequate bandwidth, outdated hardware and software, and limited technical support. Resource constraints are particularly acute in developing countries and under-resourced institutions, creating disparities in access to digital learning opportunities. The digital divide remains a persistent challenge, with students from disadvantaged backgrounds lacking reliable internet access and appropriate devices for online learning. Van Dijk (2005) provided a comprehensive analysis of the digital divide, while Hargittai (2008) examined digital inequality in educational contexts.

3.2 Faculty Resistance and Capability Gaps

Faculty resistance to technology adoption is a significant barrier to digital transformation. Resistance may stem from concerns about workload, lack of confidence in digital skills, skepticism about the pedagogical value of technology, or attachment to traditional teaching methods. Building faculty capabilities through professional development, training, and ongoing support is essential for overcoming resistance and enabling effective technology integration. Ertmer and Ottenbreit-Leftwich (2010) examined teacher technology change and the factors that influence adoption, while Mishra and Koehler (2006) developed the Technological Pedagogical Content Knowledge framework that has been influential in faculty development for technology integration.

3.3 Pedagogical and Curricular Challenges

Effective e-learning requires more than the mere transfer of traditional content to digital formats; it demands pedagogical approaches that leverage the unique capabilities of digital technologies. Designing engaging and effective online learning experiences requires expertise in instructional design, multimedia development, and online facilitation. Curricular redesign to accommodate flexible and hybrid learning models presents additional challenges. Laurillard (2012) provided a comprehensive framework for technology-enhanced learning, while Garrison and Vaughan (2008) examined blended learning design in higher education.

3.4 Quality Assurance and Assessment

Ensuring the quality of online and hybrid education presents significant challenges. Issues include academic integrity in online assessments, the equivalence of learning outcomes across delivery modes, and the development of appropriate quality assurance frameworks. Institutions must develop robust mechanisms for monitoring and improving the quality of e-learning offerings. The Quality Matters program has been widely adopted as a quality assurance framework for online learning, as examined by Shattuck (2015) and related researchers.

4 EMERGING DIGITAL PRACTICES AND PEDAGOGICAL INNOVATIONS

4.1 Student-Centered Learning Environments

Digital technologies enable the creation of student-centered learning environments that support personalized, active, and collaborative learning. Adaptive learning systems tailor content and pace to individual student needs, while collaborative tools enable peer interaction and knowledge sharing. Student-centered approaches emphasize learner autonomy, engagement, and the development of higher-order thinking skills. Jonassen (2000) provided foundational work on student-centered learning, while Yang, Kinshuk, and Chen (2021) examined adaptive learning technologies in higher education.

4.2 Emerging Technologies in Education

Emerging technologies including augmented reality, virtual reality, artificial intelligence, and learning analytics offer new possibilities for enhancing educational delivery. Augmented and virtual reality create immersive learning experiences, AI-powered tutoring systems provide personalized support, and learning analytics enable data-driven insights into student performance and engagement. Wang, Jung, Kang, and Chung (2021) examined virtual reality applications in education, while Baker and Siemens (2014) provided an overview of learning analytics and educational data mining.

4.3 Blended and Hybrid Learning Models

Blended and hybrid learning models, combining online and face-to-face instruction, have gained prominence as institutions seek to leverage the advantages of both delivery modes. These models offer flexibility for students while maintaining opportunities for in-person interaction and hands-on learning. Effective implementation requires careful

design to integrate online and offline components coherently. Garrison and Vaughan (2008) provided a comprehensive framework for blended learning design, while Graham (2006) examined the evolution of blended learning.

4.4 Quality 4.0 in Education

The concept of Quality 4.0, applying Industry 4.0 principles to quality management, has been extended to education. This approach emphasizes the use of digital technologies for continuous improvement, data-driven decision-making, and the enhancement of educational quality. Applications include automated assessment, learning analytics, and quality monitoring systems. Imran and Almusharraf (2024) examined digital learning demand and applicability of Quality 4.0 for future education.

Table 1: Factors Influencing E-Learning Adoption in Higher Education

Factor Category	Specific Factors	Impact on Adoption
Individual	Perceived usefulness, perceived ease of use, self-efficacy	Positive influence
Individual	Computer anxiety, prior experience	Negative/Moderating influence
Contextual	Infrastructure, technical support, institutional policy	Enabling/Constraining
Social	Peer influence, subjective norms, social presence	Positive influence
Pedagogical	Perceived learning styles, teaching styles, content suitability	Moderating influence

5 FUTURE PROSPECTS

The future of digital transformation in higher education will be shaped by several emerging trends. First, the integration of artificial intelligence will enable more personalized and adaptive learning experiences, with AI-powered tutoring systems, intelligent content recommendation, and automated assessment becoming increasingly sophisticated. Learning analytics will provide deeper insights into student behavior and performance, enabling early intervention and targeted support.

Second, the boundaries between formal and informal learning will continue to blur, with micro-credentials, digital badges, and lifelong learning platforms complementing traditional degree programs. This will require institutions to rethink their value propositions and develop more flexible and modular educational offerings.

Third, the metaverse and immersive technologies will create new possibilities for collaborative and experiential learning, enabling virtual laboratories, simulations, and global classrooms. These technologies will transform how students engage with content and with each other, creating more engaging and interactive learning experiences.

Fourth, the focus on equity and inclusion will intensify, with institutions developing strategies to address the digital divide and ensure that all students have access to the benefits of digital transformation. This will require investment in infrastructure, digital literacy programs, and support services for disadvantaged students.

Finally, the role of faculty will evolve, with educators becoming facilitators of learning rather than merely transmitters of content. This will require new approaches to faculty development, institutional support, and recognition and reward systems that value innovative teaching practices.

6 CONCLUSION

This review has examined digital transformation in higher education, focusing on e-learning adoption and institutional change processes. The evidence demonstrates that e-learning adoption is influenced by a complex interplay of individual, contextual, social, and pedagogical factors. Perceived ease of use, usefulness, self-efficacy, and facilitating conditions are critical determinants of adoption, while infrastructure limitations, faculty resistance, and pedagogical challenges present significant barriers.

The COVID-19 pandemic accelerated digital transformation in higher education, revealing both the potential and the limitations of existing capabilities. Institutions that invested in digital infrastructure, faculty development, and student support were better positioned to navigate the transition to online and hybrid learning.

Emerging digital practices and pedagogical innovations, including student-centered learning, immersive technologies, and blended learning models, offer new possibilities for enhancing educational quality and accessibility. However,

realizing these possibilities requires strategic investment, institutional commitment, and ongoing attention to equity and inclusion.

The future of digital transformation in higher education will be characterized by greater personalization, flexibility, and integration of emerging technologies. Institutions that embrace these trends while addressing the associated challenges will be well-positioned to thrive in an increasingly digital educational landscape.

REFERENCES

- [1] Abdullah, F., & Ward, R. (2016). Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors. *Computers in Human Behavior*, 56, 238–256. <https://doi.org/10.1016/j.chb.2015.11.036>
- [2] Al-Emran, M., Mezhyuev, V., & Kamaludin, A. (2018). Technology acceptance model in M-learning context: A systematic review. *Computers & Education*, 125, 389–412. <https://doi.org/10.1016/j.compedu.2018.06.008>
- [3] Anderson, T. (Ed.). (2008). *The theory and practice of online learning* (2nd ed.). AU Press.
- [4] Baker, R. S., & Siemens, G. (2014). Educational data mining and learning analytics. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (2nd ed., pp. 253–272). Cambridge University Press. <https://doi.org/10.1017/CBO9781139519526.016>
- [5] Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.
- [6] Compeau, D. R., & Higgins, C. A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19(2), 189–211. <https://doi.org/10.2307/249688>
- [7] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- [8] Ertmer, P. A., & Ottenbreit-Leftwich, A. T. (2010). Teacher technology change: How knowledge, confidence, beliefs, and culture intersect. *Journal of Research on Technology in Education*, 42(3), 255–284. <https://doi.org/10.1080/15391523.2010.10782551>
- [9] Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2–3), 87–105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6)
- [10] Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. Jossey-Bass.
- [11] Graham, C. R. (2006). Blended learning systems: Definition, current trends, and future directions. In C. J. Bonk & C. R. Graham (Eds.), *The handbook of blended learning: Global perspectives, local designs* (pp. 3–21). Pfeiffer.
- [12] Hall, G. E., & Hord, S. M. (2015). *Implementing change: Patterns, principles, and potholes* (4th ed.). Pearson.
- [13] Hargittai, E. (2008). The digital reproduction of inequality. In D. Grusky (Ed.), *Social stratification* (pp. 936–944). Westview Press. <https://doi.org/10.4324/9780429494468-111>
- [14] Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020, March 27). The difference between emergency remote teaching and online learning. *Educause Review*. <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- [15] Imran, M., & Almusharraf, N. (2024). Digital learning demand and applicability of Quality 4.0 for future education: A systematic review. *International Journal of Engineering Pedagogy*, 14(4), 38–53. <https://doi.org/10.3991/ijep.v14i4.48512>
- [16] Jonassen, D. H. (2000). *Computers as mindtools for schools: Engaging critical thinking* (2nd ed.). Prentice Hall.
- [17] Laurillard, D. (2012). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Routledge. <https://doi.org/10.4324/9780203125083>
- [18] Marakas, G. M., Yi, M. Y., & Johnson, R. D. (1998). The multilevel and multifaceted character of computer self-efficacy: Toward clarification of the construct and an integrative framework for research. *Information Systems Research*, 9(2), 126–163. <https://doi.org/10.1287/isre.9.2.126>
- [19] Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- [20] Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.

- [21] Shard, D. K., & Koul, S. (2024). Digital transformation in higher education: A comprehensive review of e-learning adoption. *Human Systems Management*, 43(4), 433–454. <https://doi.org/10.3233/HSM-230095>
- [22] Shattuck, K. (Ed.). (2015). *Researching and evaluating online and blended learning: A practitioner's guide*. Quality Matters.
- [23] Van Dijk, J. A. G. M. (2005). *The deepening divide: Inequality in the information society*. Sage Publications. <https://doi.org/10.4135/9781452229812>
- [24] 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. <https://doi.org/10.2307/30036540>
- [25] Wang, G., Jung, J., Kang, M., & Chung, T. (2021). Virtual reality applications in education: A systematic literature review. *Interactive Learning Environments*, 29(1), 1–19. <https://doi.org/10.1080/10494820.2021.1943687>
- [26] Yang, J., Kinshuk, & Chen, Y. (2021). Adaptive learning and learning analytics in online and blended learning: A systematic review. *Journal of Educational Technology Systems*, 49(3), 267–292. <https://doi.org/10.1177/0047239520958682>