

A Synthesis of e-Learning Research Topics: A Qualitative Content Analysis

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Abstract: Because of the prevalence and improvements in digital technology, e-learning is now commonly delivered in various delivery modes, including online, blended, and mobile learning. Over the years, extensive research on e-learning has explored diverse topics, ranging from instructional design to digital skills, student-centred learning, and so on. Given the ever-expanding body of literature, there is an essential need to systematically synthesise the vast research topics on e-learning. This study addresses this need by conducting a qualitative content analysis of primary empirical articles on e-learning that were published in the Electronic Journal of e-Learning (EJEL) from its first issue in 2003 to 2024. The primary objective of this study is to examine the research foci of these articles to identify key research topics, thereby providing a thorough review of e-learning research over the last two decades. The study findings suggested six main categories of research topics: (1) user experience, (2) learner attributes, (3) learning outcomes, (4) teaching and learning, (5) adoption barriers, and (6) educator preparedness. The findings also showed that the six main categories could be further divided into 21 subcategories. These topics reflect a broad range of e-learning research across pedagogical, technological, and sociocultural dimensions. By synthesising e-learning research over the past two decades in EJEL, this study adds to the cumulative body of knowledge on research topics that have shaped the research landscape in e-learning, as well as reveals potentially underexplored areas.

Keywords: Digital Technology, Educational Research, E-learning, Qualitative Content Analysis, Research Synthesis

1. Introduction

The widespread accessibility of the internet, as well as the prevalent adoption of digital technology such as computers and smartphones, has fuelled the growth of e-learning (Ghali and Amari, 2024). In contrast to face-to-face learning, e-learning provides learners the opportunity to learn outside of physical constraints, such as time and location (Chaw and Tang, 2019; Cronje, 2022). However, compared to face-to-face learning, e-learning requires different pedagogical approaches, learning designs, and assessment strategies for effective knowledge transfer and skill development (Almasri, 2022; Gasmir and Bouhadada, 2023; Rabayah and Amira, 2022).

Previous studies have investigated diverse research topics on e-learning. As the body of literature grows, some studies have attempted to synthesise e-learning research to classify themes or research topics. Some of these studies extend back to the early 2000s (e.g., Cronje, 2014; Hung, 2012; Lin and Hu, 2015; Maurer and Khan, 2010). Some of the more recent studies include Brika et al.'s (2022) bibliometric analysis of 602 e-learning articles from 2020 to 2021; Pathak and Singh's (2023) bibliometric analysis of 417 e-learning articles from 2020 to 2023; and Peters et al.'s (2022) scoping review of 291 articles from 2015 to early 2020 by authors affiliated with the Universitat Oberta de Catalunya. However, relying solely on bibliometric analysis that primarily focuses on publication metadata or only articles published by authors affiliated with a single university limits the breadth and depth of the analysis.

To address this research gap, this study conducted a qualitative content analysis of primary empirical articles published in the Electronic Journal of e-Learning (EJEL) from its first issue in 2003 to 2024. The objective of this study is to address the research gap by providing a more extensive and up-to-date synthesis of research topics on e-learning. This study adds the recent findings to the cumulative body of knowledge in e-learning research and provides educators, researchers, and policymakers with useful insights into the current state and future directions of e-learning research. Furthermore, this study supports the assertions by Brika et al. (2022), Pathak and Singh (2023), and Peters et al. (2022) that such a study can help identify research synergies and gaps for future e-learning research.

The remainder of this paper provides a background to the research, explains the research design and method, presents the study findings, and concludes with a discussion of the study findings.

2. Research Background

2.1 E-Learning

Unlike face-to-face learning, e-learning provides learners with the flexibility and accessibility to learn at their own pace and from anywhere (Gashi et al., 2024). The wide availability of internet connectivity and developments in technology have contributed to the increasing growth of e-learning (Paiva et al., 2016). Although technology is an integral part of e-learning (Paiva et al., 2016), Andrews and Haythornthwaite (2007) posit that e-learning is more than just using technology to deliver content; it also involves social elements such as interaction and collaboration. They further explain that these elements highlight the sociotechnical characteristics of e-learning, particularly what and how people use technology for teaching and learning.

E-learning evolves with time, as do technology and how learners, educators, and educational institutions use them in teaching and learning (Andrews and Haythornthwaite, 2007). Today's e-learning technology includes such examples as learning management systems (LMS) (e.g., Blackboard, Moodle), video conferencing tools (e.g., Zoom, Microsoft Teams), online collaboration tools (e.g., Google Docs, Padlet), multimedia tools (e.g., YouTube, Canva), and so on.

E-learning can be delivered through various modes, including online, blended, and mobile learning. Online learning delivers learning through the internet. Learners access learning materials, including learning activities and assessments, through digital platforms like LMS. However, learners need strong self-regulation and proficiency in digital skills to be comfortable in this type of online learning environment (Kwiatkowska and Wiśniewska-Nogaj, 2022; Wolverson et al., 2020). Blended learning integrates both face-to-face and online learning, supplementing face-to-face learning with the flexibility and accessibility of online learning. This mixed mode of learning promotes student-lecturer and student-student interactions, especially for social learning or hands-on activities (Najjemba and Cronjé, 2020; Suriagiri et al., 2022). Mobile learning engages learners through mobile apps using devices such as smartphones or tablets and often supports microlearning and gamification to enhance learner engagement (Kohnke, 2021; Mohtar et al., 2023).

2.2 Research Topics in E-learning

E-learning research covers a wide range of topics because it is cross-disciplinary, linking such fields as social science, cognitive science, and technology (Brika et al., 2022; Hung, 2012; Peters et al., 2022), as well as heterogeneous, investigating largely issues that are context-dependent and multifaceted (Rüth and Kaspar, 2017; Sarsa and Escudero, 2016).

Conole and Oliver (2007) identify four main themes in e-learning research: pedagogical, technical, organisational, and sociocultural issues. Pedagogical issues refer to the pedagogy of e-learning, such as learning designs, digital skills, online communities, including communication and collaboration, etc. Technical issues concern the technology in e-learning, such as technical architectures, e-learning platforms, technological developments, etc. Organisational issues relate to factors that arise at the organisational level, such as strategies for integration, organisational processes, roles and functions, etc. Sociocultural issues include the broader context that influences pedagogical, technical, and organisational issues, such as legislative requirements, policy drivers, institutional approaches and cultures, etc.

Previous studies have attempted to classify themes or research topics in e-learning. Some of the recent studies include those by Brika et al. (2022), Pathak and Singh (2023), and Peters et al. (2022). Brika et al. (2022) indicated nine clusters: motivation and students' attitudes to e-learning systems; comparison between blended learning and virtual learning; online assessment versus formative assessment; stress, anxiety, and mental health of students; education strategies to develop students' skills; quality and performance of higher education strategies of e-learning; challenges of medical education and distance learning; changing higher education curricula using technology; and using artificial intelligence to transform e-learning. Pathak and Singh (2023) highlighted five clusters: research methods; self-serving technological features; user interactivity in an online environment; COVID-19 and challenges; and collaborative learning. Peters et al. (2022) reported seven themes: design and evaluation of learning resources; learning analytics and automatisisation; e-learning adoption; innovative pedagogies and technologies; student or teacher learning practices or performances; assessment and feedback; and collaboration and interaction.

3. Research Design and Method

3.1 Qualitative Content Analysis

This study conducted a qualitative content analysis (QCA) to identify the research topics in the article texts by categories and subcategories (Mayring, 2014; Schreier, 2012). QCA systematically reduces large volumes of textual data by employing a coding frame for coding and categorisation (Schreier, 2012). QCA is well-suited to this study, as it is useful for the examination of patterns in the research topics.

3.2 Database and Article Screening

This study downloaded articles published from Vol. 1, No. 1, in 2003 to Vol. 22, No. 10, in 2024 from the online archive of the EJEL. The search resulted in a total of 640 articles. The initial screening and the subsequent full paper screening filtered out 356 articles and 26 articles that did not meet the inclusion criteria, respectively. Therefore, this study included 258 articles in the final analysis. Figure 1 depicts the flow diagram of the article screening process and the exclusion criteria.

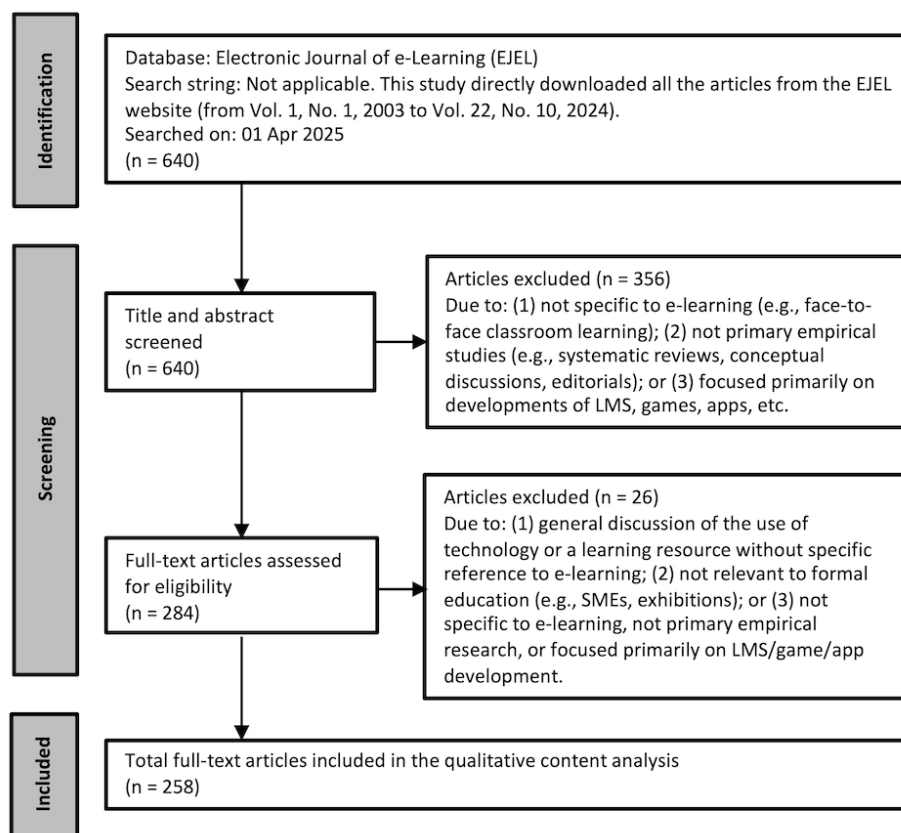


Figure 1: Flow diagram of the screening process (adopted from the PRISMA 2020 statement, Page et al., 2021)

3.3 Data Analysis

This study followed Schreier's (2012) recommended steps for QCA: (1) created a preliminary two-level coding frame from a random sample of 40 articles (about 15% of the 258 articles) using a data-driven approach; (2) segmented the article texts that were relevant to the articles' research scope into coding units; (3) conducted two rounds of trial coding in a pilot phase to evaluate the reliability of the coding frame; and (4) carried out the main analysis.

Each of the two rounds of trial coding included a random sample of 40 articles. To maintain coding consistency, the coding was done by a single coder with a two-week gap in between, as recommended by Schreier (2012). After the two rounds of trial coding, some revisions were made to the coding frame, including merging, removing, or renaming some subcategories. Between the two rounds, the percentage of agreement was 88.51%

(i.e., the number of coding units on which the coder agreed divided by the total number of coded units). Thus, the intra-coder reliability was satisfactory.

Figure 2 depicts the final coding frame that was used in the main analysis, which consisted of six level-one categories and 21 level-two subcategories. The level-one categories represent the main dimensions, and the level-two subcategories represent the subdimensions. The coding frame satisfied four methodological requirements: unidimensionality, mutual exclusiveness, exhaustiveness, and saturation (Schreier, 2012). In QCA, a coding unit can be coded into more than one subcategory. However, a coding unit cannot be coded to more than one subcategory within the same category.

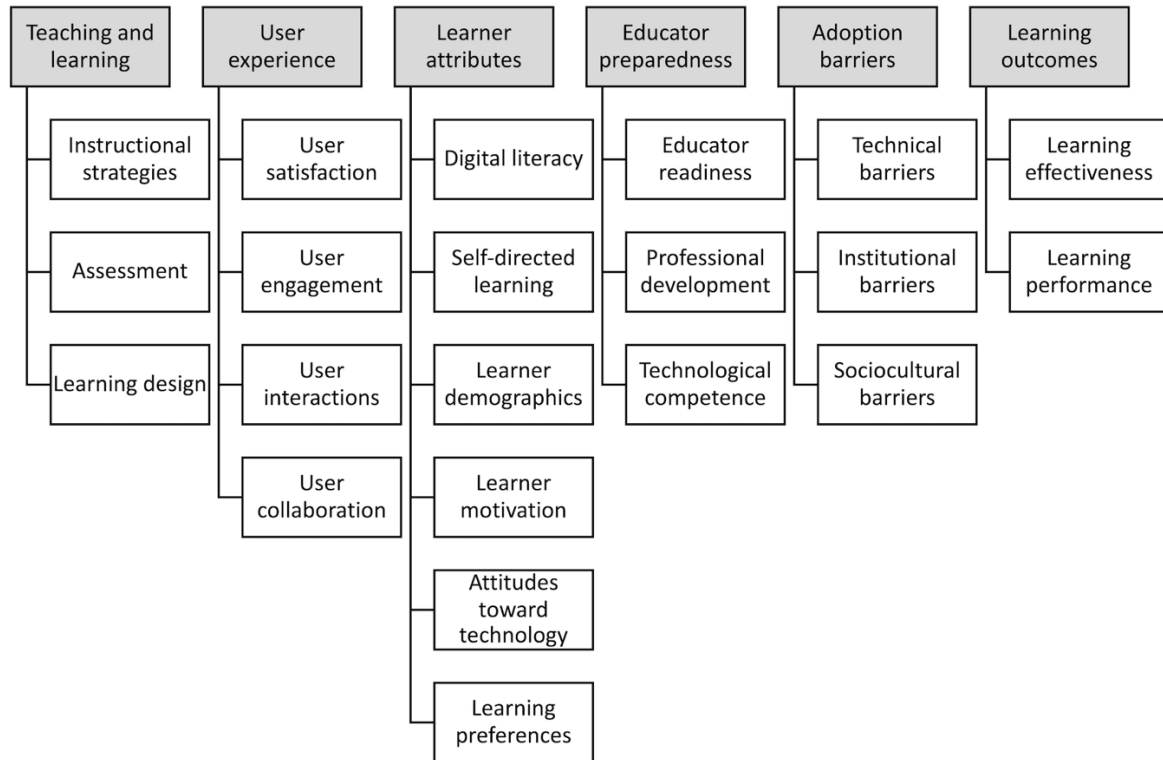


Figure 2: Coding frame

4. Study Findings

Table 1 shows the frequency and percentage of coding units coded into subcategories. The top five subcategories in order of frequency are user engagement (10.1%), learning effectiveness (10%), learning design (8.9%), learning performance (8.9%), and attitudes toward technology (5.6%). The bottom five subcategories are digital literacy (2.7%), learning preferences (2.7%), sociocultural barriers (2.7%), technological competence (2.5%), and professional development (1.9%).

Table 1: Frequency and percentage of coding units coded into a subcategory

Subcategory	Frequency	Percentage (%)
User engagement	74	10.1%
Learning effectiveness	73	10.0%
Learning design	65	8.9%
Learning performance	65	8.9%
Attitudes toward technology	41	5.6%
Learner demographics	35	4.8%
User satisfaction	33	4.5%
User collaboration	33	4.5%

Subcategory	Frequency	Percentage (%)
User Interactions	32	4.4%
Educator readiness	31	4.2%
Learner motivation	29	4.0%
Technical barriers	29	4.0%
Instructional strategies	28	3.8%
Assessment	27	3.7%
Institutional barriers	24	3.3%
Self-directed learning	21	2.9%
Digital literacy	20	2.7%
Learning preferences	20	2.7%
Sociocultural barriers	20	2.7%
Technological competence	18	2.5%
Professional development	14	1.9%
<i>Total</i>	<i>732</i>	<i>100.0%</i>

Table 2 shows the frequency and percentage of coding units coded into a subcategory both within and across categories. Across categories, user experience is the largest category (23.5%), followed by learner attributes (22.7%), learning outcomes (18.9%), teaching and learning (16.4%), adoption barriers (10%), and educator preparedness (8.6%). Within individual categories, user engagement (43%), attitudes toward technology (24.7%), learning effectiveness (52.9%), learning design (54.2%), technical barriers (39.7%), and educator readiness (49.2%) were the top subcategories in the user experience, learner attributes, learning outcomes, teaching and learning, adoption barriers, and educator preparedness categories, respectively.

Table 2: Frequency and percentage within and across categories

Category	Subcategory	Frequency	Within Category Percentage (%)	Across Category Percentage (%)
User experience	User engagement	74	43.0%	
	User satisfaction	33	19.2%	
	User collaboration	33	19.2%	
	User Interactions	32	18.6%	
	<i>Subtotal</i>	<i>172</i>	<i>100.0%</i>	<i>23.5%</i>
Learner attributes	Attitudes toward technology	41	24.7%	
	Learner demographics	35	21.1%	
	Learner motivation	29	17.5%	
	Self-directed learning	21	12.7%	
	Digital literacy	20	12.0%	
	Learning preferences	20	12.0%	
	<i>Subtotal</i>	<i>166</i>	<i>100.0%</i>	<i>22.7%</i>
Learning outcomes	Learning effectiveness	73	52.9%	
	Learning performance	65	47.1%	
	<i>Subtotal</i>	<i>138</i>	<i>100.0%</i>	<i>18.9%</i>
Teaching and learning	Learning design	65	54.2%	
	Instructional strategies	28	23.3%	
	Assessment	27	22.5%	

Category	Subcategory	Frequency	Within Category Percentage (%)	Across Category Percentage (%)
	<i>Subtotal</i>	120	100.0%	16.4%
Adoption barriers	Technical barriers	29	39.7%	
	Institutional barriers	24	32.9%	
	Sociocultural barriers	20	27.4%	
	<i>Subtotal</i>	73	100.0%	10.0%
Educator preparedness	Educator readiness	31	49.2%	
	Technological competence	18	28.6%	
	Professional development	14	22.2%	
	<i>Subtotal</i>	63	100.0%	8.6%

5. Discussion and Conclusions

The study findings reflect nearly two decades of research topics on e-learning in EJEL, with six main categories emerging: (1) user experience, (2) learner attributes, (3) learning outcomes, (4) teaching and learning, (5) adoption barriers, and (6) educator preparedness. Within the main dimensions, there are 21 subdimensions.

The largest main dimension is user experience, accounting for nearly a quarter of all coded units. This dimension encompasses learners' and educators' interactions with technology and learning environments across four subdimensions: (1) user engagement (such as behavioural and cognitive involvement in e-learning activities) (e.g., Cui and Coleman, 2020; Sadeck et al., 2023); (2) user satisfaction (such as subjective evaluation of e-learning experience) (e.g., Cação, 2017; Wolverton et al., 2020); (3) user collaboration (such as group-based collaborative learning) (e.g., Barber and King, 2016; Cronje and van Zyl, 2022; Straková and Cimermanová, 2018); and (4) user interactions (such as learner-learner and learner-instructor interactions) (e.g., Elizondo-Garcia and Gallardo, 2020; Xiu and Thompson, 2020). Among these, user engagement is the largest subdimension.

The second largest main dimension is learner attributes, accounting for just under a quarter of all coded units. This dimension captures learners' characteristics across six subdimensions: (1) attitudes toward technology (such as beliefs or feelings about digital tools) (e.g., Al Arif et al., 2024; Chan et al., 2015; Fauzi et al., 2021); (2) learner demographics (such contextual factors as cultural background and prior experience) (e.g., Chaw and Tang, 2023; Kurtz et al., 2022; Luef et al., 2019); (3) learner motivation (such as intrinsic or extrinsic drivers for engagement) (Berestova et al., 2022; Eltahir and Babiker, 2024; Valdez and Maderal, 2021); (4) self-directed learning (such as initiative and responsibility for one's own learning) (e.g., Adinda and Mohib, 2020; Akinyi et al., 2024; Sadeck et al., 2023); (5) digital literacy (such as competence and proficiency in technology) (e.g., Hall et al., 2013; Kwiatkowska and Wiśniewska-Nogaj, 2022; Tang and Chaw, 2016); and (6) learning preferences (such as preferred modes of learning) (e.g., Al-Azawei and Lundqvist, 2015; Chaw and Tang, 2023; Garthwait, 2014). Among these, attitudes toward technology is the largest subdimension.

The third largest main dimension is learning outcomes, accounting for nearly one-fifth of all coded units. This dimension evaluates results from the learning process across two subdimensions: (1) learning effectiveness (such as perceived quality and goal attainment of the learning process) (e.g., Bentley et al., 2012; Oluwadele et al., 2024; Tang and Chaw, 2016) and (2) learning performance (such quantifiable achievements as test scores and completion rates) (e.g., Cui and Coleman, 2020; Eltahir and Babiker, 2024; Kurtz et al., 2022). Both subdimensions are largely comparable in size.

The fourth largest main dimension is teaching and learning, accounting for just over one-sixth of all coded units. This dimension examines the planning, execution, and evaluation of learning delivery across three subdimensions: (1) learning design (such as learning outcomes, activities, and resources) (e.g. Adinda and Mohib, 2020; Elizondo-Garcia and Gallardo, 2020; Oluwadele et al., 2024); (2) instructional strategies (such as pedagogical approaches for learning delivery) (e.g., Barber and King, 2016; Charbonneau-Gowdy and Galdames, 2024; Cui and Coleman, 2020); and (3) assessment (such as formative and summative evaluation methods) (e.g., Dominguez-Figaredo et al., 2022; Nakayama et al., 2010; Valdez and Maderal, 2021). Among these, learning design is the largest subdimension.

The fifth largest main dimension is adoption barriers, accounting for about one-tenth of all coded units. This dimension highlights the challenges and obstacles that can hinder e-learning adoption across three subdimensions: (1) technical barriers (such as technology infrastructure and internet access) (e.g., Ahmed et al., 2018; Berestova et al., 2022; Weber et al., 2014); (2) institutional barriers (such as organisational policies and resource allocation) (e.g., Delgaty, 2017; MacKeogh and Fox, 2009; Roushan et al., 2016); and (3) sociocultural barriers (such as cultural or societal norms) (e.g., Ahmed et al., 2018; Charbonneau-Gowdy, 2018; Eppard et al., 2021). Among these, technical barriers is the largest subdimension.

The sixth largest main dimension is educator preparedness, accounting for just under one-tenth of all coded units. This dimension examines the capacities needed for effective e-learning adoption across three subdimensions: (1) educator readiness (such as willingness, confidence, and openness to adopt technology) (e.g., Greener and Wakefield, 2015; Kyalo and Hopkins, 2013; MacKeogh and Fox, 2009); (2) technological competence (such as proficiency with digital tools) (e.g., Almpanis, 2015; Greener and Wakefield, 2015; Kyalo and Hopkins, 2013); and (3) professional development (such as training programmes and continuous learning opportunities) (e.g., Almpanis, 2015; Greener and Wakefield, 2015; Kyalo and Hopkins, 2013). Among these, educator readiness is the largest subdimension.

In conclusion, the study findings help meet the research objective and fill in the research gap with a more extensive and up-to-date synthesis of research topics on e-learning. These findings indicate the areas that have received greater attention and those that may be further explored for a deeper understanding of the digital transformation of learning, from its design, planning, and implementation to continuous improvement. In addition, as technology advances and learners' digital literacy improves, it may be necessary to revisit some well-researched areas for updates in today's educational, technological, and sociocultural context.

Ethics and AI Declaration

This study did not require ethics approval as it involved only a literature review of articles published in EJEL, and the use of AI was mainly for preliminary searches and grammatical checks.

References

- Adinda, D. and Mohib, N. (2020) "Teaching and Instructional Design Approaches to Enhance Students' Self-Directed Learning in Blended Learning Environments", *Electronic Journal of e-Learning*, Vol. 18 No. 2, pp 162-174.
- Ahmed, M. U., Hussain, S. and Farid, S. (2018) "Factors Influencing the Adoption of e-Learning in an Open and Distance Learning Institution of Pakistan", *Electronic Journal of e-Learning*, Vol 16 No 2, pp 148-158.
- Akinyi, G. L., Oboko, R. and Muchemi, L. (2024) "Learning Analytics Intervention Using Prompts and Feedback for Measurement of e-Learners' Socially-Shared Regulated Learning", *Electronic Journal of e-Learning*, Vol 22 No 5, pp 103-116.
- Al Arif, T. Z. Z., Kurniawan, D., Handayani, R., Hidayati and Armiwati (2024) "EFL University Students' Acceptance and Readiness for e-Learning: A Structural Equation Modeling Approach", *Electronic Journal of e-Learning*, Vol 22 No 1, pp 1-16.
- Al-Azawei, A. and Lundqvist, K. (2015) "Learner Differences in Perceived Satisfaction of an Online Learning: An Extension to the Technology Acceptance Model in an Arabic Sample", *Electronic Journal of e-Learning*, Vol 13 No 5, pp 408-426.
- Almasri, F. (2022) "The Impact of e-Learning, Gender-Groupings and Learning Pedagogies in Biology Undergraduate Female and Male Students' Attitudes and Achievement", *Education and Information Technologies*, Vol 27 No. 6, pp 8329-8380.
- Almpanis, T. (2015) "Staff Development and Institutional Support for Technology Enhanced Learning in UK Universities", *Electronic Journal of e-Learning*, Vol 13 No 5, pp 380-389.
- Andrews, R. and Haythornthwaite, C. (2007) "Introduction to e-learning Research", In R. Andrews and C. Haythornthwaite, (Eds) *The SAGE Handbook of e-Learning Research* (1st ed., pp 1-52), SAGE Publications.
- Barber, W. and King, S. (2016) "Teacher-Student Perspectives of Invisible Pedagogy: New Directions in Online Problem-Based Learning Environments", *Electronic Journal of e-Learning*, Vol 14 No 4, pp 235-243.
- Bentley, Y., Selassie, H. and Shegunshi, A. (2012) "Design and Evaluation of Student-Focused eLearning", *Electronic Journal of e-Learning*, Vol 10 No 1, pp 1-12.
- Berestova, A., Burdina, G., Lobuteva, L. and Lobuteva, A. (2022) "Academic Motivation of University Students and the Factors that Influence it in an e-Learning Environment", *Electronic Journal of e-Learning*, Vol 20 No 2, pp 201-210.
- Brika, S. K. M., Chergui, K., Algamdi, A., Musa, A. A. and Zouaghi, R. (2022) "E-Learning Research Trends in Higher Education in Light of COVID-19: A Bibliometric Analysis", *Frontiers in Psychology*, Vol 12, No 762819, pp 1-10.
- Cação, R. (2017) "Motivational Gaps And Perceptual Bias of Initial Motivation Additional Indicators of Quality for e-Learning Courses", *Electronic Journal of e-Learning*, Vol 15 No 1, pp 3-16.

- Chan, K., Cheung, G., Wan, K., Brown, I. and Luk, G. (2015) "Synthesizing Technology Adoption and Learners' Approaches towards Active Learning in Higher Education", *Electronic Journal of e-Learning*, Vol 13 No 6, pp 431-440.
- Charbonneau-Gowdy, P. (2018) "Beyond Stalemate: Seeking Solutions to Challenges in Online and Blended Learning Programs", *Electronic Journal of e-Learning*, Vol 16 No 1, pp 56-66.
- Charbonneau-Gowdy, P. and Galdames, C. (2024) "Identity Matters: A Framework for Bridging Contemporary e-Learning Theory with Online Practice", *Electronic Journal of e-Learning*, Vol 22 No 7, pp 1-19.
- Chaw, L. Y. and Tang, C. M. (2019) "Driving High Inclination to Complete Massive Open Online Courses (MOOCs): Motivation and Engagement Factors for Learners", *Electronic Journal of e-Learning*, Vol 17 No 2, pp 118-130.
- Chaw, L. Y. and Tang, C. M. (2023) "Learner Characteristics and Learners' Inclination towards Particular Learning Environments", *Electronic Journal of e-Learning*, Vol 21 No 1, pp 1-12.
- Conole, G. and Oliver, M. (2007) *Contemporary Perspectives in e-Learning Research Themes, Methods and Impact on Practice*, Routledge.
- Cronje, J. (2014) "An African Research Agenda for Computers in Education", *Electronic Journal of e-Learning*, Vol 12 No 1, pp 14-28.
- Cronje, J. (2022) "From face-to-face to Distance: Towards Flexibility in five Dimensions of Blended Learning: Lessons Learnt from the Covid-19 Pandemic", *Electronic Journal of e-Learning*, Vol 20 No 4, pp 436-450.
- Cronje, J. and van Zyl, I. (2022) "WhatsApp as a Tool for Building a Learning Community", *Electronic Journal of e-Learning*, Vol 20 No 3, pp 296-312.
- Cui, T. and Coleman, A. (2020) "Investigating Students' Attitudes, Motives, Participation and Performance Regarding Out-of-Class Communication (OCC) in a Flipped Classroom", *Electronic Journal of e-Learning*, Vol 18 No 6, pp 550-561.
- Delgaty, L. E. (2017) "Redefining Practice: Challenging Academic and Institutional Traditions with Clinical Distance Learning", *Electronic Journal of e-Learning*, Vol 15 No 1, pp 17-32.
- Dominguez-Figaredo, D., Gil-Jaurena, I. and Morentin-Encina, J. (2022) "The Impact of Rapid Adoption of Online Assessment on Students' Performance and Perceptions: Evidence from a Distance Learning University", *Electronic Journal of e-Learning*, Vol 20 No 3, pp 224-241.
- Elizondo-Garcia, J. and Gallardo, K. (2020) "Peer Feedback in Learner-Learner Interaction Practices. Mixed Methods Study on an xMOOC", *Electronic Journal of e-Learning*, Vol 18 No 2, pp 122-135.
- Eltahir, M. E. and Babiker, F. M. E. (2024) "The Influence of Artificial Intelligence Tools on Student Performance in e-Learning Environments: Case Study", *Electronic Journal of e-Learning*, Vol 22 No 9, pp 91-110.
- Eppard, J., Kaviani, A., Bowles, M. and Johnson, J. (2021) "EdTech Culturation: Integrating A Culturally Relevant Pedagogy into Educational Technology", *Electronic Journal of e-Learning*, Vol 19 No 6, pp 516-530.
- Fauzi, A., Wandira, R., Sepri, D. and Hafid, A. (2021) "Exploring Students' Acceptance of Google Classroom during the Covid-19 Pandemic by Using the Technology Acceptance Model in West Sumatera Universities", *Electronic Journal of e-Learning*, Vol 19 No 4, pp 233-240.
- Garthwait, A. (2014) "Pilot Program of Online Learning in Three Small High Schools: Considerations of Learning Styles", *Electronic Journal of e-Learning*, Vol 12 No 4, pp 353-366.
- Gashi, A., Zhushi, G. and Krasniqi, B. (2024) "Exploring Determinants of Student Satisfaction with Synchronous e-Learning: Evidence during COVID-19", *Campus-Wide Information Systems*, Vol 41 No 1, pp 1-20.
- Gasmi, S. and Bouhadada, T. (2023) "Empowering Teachers in e-Learning: A Case-Based Recommender System for Effective Learning Design", *International Journal of Emerging Technologies in Learning*, Vol 18 No 20, pp 166-182.
- Ghali, Z. and Amari, A. (2024) "Assessing the Effectiveness of e-Learning under the Moderating Role of Self-Efficacy", *Education and Information Technologies*, Vol 29 No 7, pp 8327-8346.
- Greener, S. and Wakefield, C. (2015) "Developing Confidence in the Use of Digital Tools in Teaching", *Electronic Journal of e-Learning*, Vol 13 No 4, pp 260-267.
- Hall, M., Nix, I. and Baker, K. (2013) "Student Experiences and Perceptions of Digital Literacy Skills Development: Engaging Learners by Design?", *Electronic Journal of e-Learning*, Vol 11 No 3, pp 207-225.
- Hung, J. (2012) "Trends of e-Learning Research from 2000 To 2008: Use of Text Mining and Bibliometrics", *British Journal of Educational Technology*, Vol 43 No 1, pp 5-16.
- Kohnke, L. (2021) "Optimizing Microlearning Materials for Mobile Learning", In J.R. Corbeil, B.H. Khan and M.E. Corbeil, (Eds.) *Microlearning in the Digital Age: The Design and Delivery of Learning in Snippets* (1st ed., pp 80-94), Routledge.
- Kurtz, G., Kopolovich, O., Segev, E., Sahar-Inbar, L., Gal, L. and Hammer, R. (2022) "Impact of an Instructor's Personalized Email Intervention on Completion Rates in a Massive Open Online Course (MOOC)", *Electronic Journal of e-Learning*, Vol 20 No 3, pp 325-335.
- Kwiatkowska, W. and Wiśniewska-Nogaj, L. (2022) "Digital Skills and Online Collaborative Learning: The Study Report", *Electronic Journal of e-Learning*, Vol 20 No 5, pp 510-522.
- Kyalo, I. W. and Hopkins, S. (2013) "Exploring the Acceptability of Online Learning for Continuous Professional Development at Kenya Medical Training Colleges", *Electronic Journal of e-Learning*, Vol 11 No 2, pp 82-90.
- Lin, X. F. and Hu, Q. (2015) "Trends in e-Learning Research from 2002-2013: A Co-citation Analysis", *IEEE 15th International Conference on Advanced Learning Technologies*, Hualien, Taiwan, pp 483-485.
- Luef, E. M., Ghebru, B. and Ion, L. (2019) "Language Proficiency and Smartphone-aided Second Language Learning: A look at English, German, Swahili, Hausa and Zulu", *Electronic Journal of e-Learning*, Vol 17 No 1, pp 25-37.
- MacKeogh, K and Fox, S. (2009) "Strategies for Embedding e-Learning in Traditional Universities: Drivers and Barriers", *Electronic Journal of e-Learning*, Vol 7 No 2, pp 147-154.

- Maurer, H. and Khan, M. S. (2010) "Research trends in the Field of e-Learning from 2003 To 2008: A Scientometric and Content Analysis for Selected Journals and Conferences Using Visualization", *Interactive Technology and Smart Education*, Vol 7 No 1, pp 5-18.
- Mayring, P. (2014) *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution*, Klagenfurt.
- Mohtar, S., Jomhari, N., Omar, N. A., Mustafa, M. B. P. and Yusoff, Z. M. (2023) "The Usability Evaluation on Mobile Learning Apps with Gamification for Middle-Aged Women", *Education and Information Technologies*, Vol 28 No 1, pp 1189-1210.
- Najjemba, J. L. and Cronjé, J. (2020) "Engagement with and Participation in Online Role Play Collaborative Arguments: A Sociocultural Perspective", *Electronic Journal of e-Learning*, Vol 18 No 5, pp 436-448.
- Nakayama, M., Yamamoto, H. and Santiago, R. (2010) "The Role of Essay Tests Assessment in e-Learning: A Japanese Case Study", *Electronic Journal of e-Learning*, Vol 8 No 2, pp 173-178.
- Oluwadele, D., Singh, Y. and Adeliyi, T. (2024) "Operationalizing a Weighted Performance Scoring Model for Sustainable e-Learning in Medical Education: Insights from Expert Judgement", *Electronic Journal of e-Learning*, Vol 22 No 8, pp 24-40.
- Page, M.J., McKenzie, J.E., Bossuyt, P.M., Boutron, I., Hoffmann, T.C., Mulrow, C.D., . . . Moher, D. (2021) "The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews", *BMJ*, Vol 372, No 71, pp 1-9.
- Paiva, J., Morais, C., Costa, L. and Pinheiro, A. (2016) "The Shift from "e-Learning" To "Learning": Invisible Technology and the Dropping of the "e""", *British Journal of Educational Technology*, Vol 47 No 2, pp 226-238.
- Pathak, S. and Singh, N. (2023) "Trends in e-learning Research: Bibliometric Analysis on Scopus Publications Post COVID-19 in Asian Context", *Journal of Economic and Administrative Sciences*.
- Peters, M., Perez-Navarro, A. and Fabregues, S. (2022) "A Systematic Mapping of e-Learning Research: An Interdisciplinary and Multi-paradigmatic Perspective from the Universitat Oberta de Catalunya", *Electronic Journal of e-Learning*, Vol 20 No 4, pp 451-466.
- Rabayah, K. S. and Amira, N. (2022) "Learners' Engagement Assessment in e-Learning during the COVID-19 Pandemic: Nation-Wide Exploration", *Education and Information Technologies*, Vol 27 No 8, pp 10647-10663.
- Roushan, G., Holley, D. and Biggins, D. (2016) "The kaleidoscope of Voices: An Action Research Approach to Informing Institutional e-Learning Policy", *Electronic Journal of e-Learning*, Vol 14 No 5, pp 293-300.
- Rüth, M. and Kaspar, K. (2017) "The e-Learning Setting Circle: First Steps toward Theory Development in e-Learning Research", *Electronic Journal of e-Learning*, Vol 15 No 1, pp 94-103.
- Sadeck, O., Moyo, M., Tunjera, N. and Chigona, A. (2023) "Self-Regulated e-Learning in Pre-Service Teacher Training for Realities of 21st Century Classrooms", *Electronic Journal of e-Learning*, Vol 21 No 3, pp 211-221.
- Sarsa, J. and Escudero, T. (2016) "A Roadmap to Cope with Common Problems in e-Learning Research Designs", *Electronic Journal of e-Learning*, Vol 14 No 5, pp 336-349.
- Schreier, M. (2012) *Qualitative Content Analysis in Practice*, SAGE, Thousand Oaks.
- Steffens, K. (2015) "Competences, Learning Theories and MOOCs: Recent Developments in Lifelong Learning", *European Journal of Education*, Vol 50 No 1, pp 41-59.
- Straková, Z. and Cimermanová, I. (2018) "Developing Reflective Skills of Student Teachers in the Virtual Learning Environment", *Electronic Journal of e-Learning*, Vol 16 No 2, pp 107-121.
- Suriagiri, S., Norlaila, Wahyurudhanto, A. and Dalle, J. (2022) "Online Vs. In-Campus, Comparative Analysis of Intrinsic Motivation Inventory, Student Engagement and Satisfaction: A Way Forward for Post COVID-19 Era", *Electronic Journal of e-Learning*, Vol 20 No 5, pp 588-604.
- Tang, C. M. and Chaw, L. Y. (2016) "Digital literacy: A Prerequisite for Effective Learning in a Blended Learning Environment?", *Electronic Journal of e-Learning*, Vol 14 No 1, pp 54-65.
- Valdez, M. T. C. C. and Maderal, L. D. (2021) "An Analysis of Students' Perception of Online Assessments and its Relation to Motivation Towards Mathematics Learning", *Electronic Journal of e-Learning*, Vol 19 No 5, pp 416-431.
- Weber, P., Lehr, C. and Gersch, M. (2014) "Improving Virtual Collaborative Learning through Canonical Action Research", *Electronic Journal of e-Learning*, Vol 12 No 4, pp 326-338.
- Wolverton, C.C., Guidry Hollier, B. N. and Lanier, P. A. (2020) "The Impact of Computer Self Efficacy on Student Engagement and Group Satisfaction in Online Business Courses", *Electronic Journal of e-Learning*, Vol 18 No 2, pp 175-188.
- Xiu, Y. and Thompson, P. (2020) "Effects of Video Discussion Posts on Social Presence and Course Satisfaction", *Electronic Journal of e-Learning*, Vol 18 No 5, pp 449-459.