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TRACING THE EVOLUTION OF WORKPLACE E-LEARNING TRANSFER RESEARCH: A BIBLIOMETRIC AND THEMATIC REVIEW

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Abstract:

As workplace learning increasingly shifts toward digital platforms, the growing complexity of e-learning environments has generated renewed scholarly attention. This study presents a comprehensive bibliometric analysis of global research on workplace e-learning transfer published between 2003 and 2026. Using Scopus-indexed data and employing VOSviewer and Publish or Perish software, this review maps the intellectual structure of the field, identifies influential authors, journals, institutions, and countries, and uncovers thematic clusters and emerging research trends. The study analyses 236 documents over a 23-year period. The findings reveal five major clusters associated with workplace e-learning transfer: (1) learner and workplace context; (2) knowledge management and organisational learning; (3) educational technology and instructional design; (4) digital learning environments and social interaction; and (5) knowledge economy and dissemination. The results indicate a gradual shift from individual-level determinants of transfer toward more integrated technological, organisational, and socio-economic perspectives. In addition, this review highlights prevailing theoretical foundations, identifies underexplored frameworks, and proposes a structured research agenda to guide future empirical and theory-driven investigations in digitally mediated workplace learning contexts.

Bibliometrics, E-Learning, Future Research, Network Analysis,
Training Transfer, Workplace Learning



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Introduction

Workplace learning has experienced significant transformations with the fast incorporation of digital technologies into organisational training systems (Gronseth & Hutchins, 2020; Žur & Friedl, 2021). E-learning platforms, virtual simulations, and learning management systems are now commonly employed to improve workforce competence and flexibility (Putri & Handayani, 2021). Organisations increasingly rely on digitally mediated training to solve skill shortages, support ongoing professional growth, and respond to technological change (AL-Qadhi & Abdullah, 2021). Despite these developments, the effectiveness of such initiatives is ultimately determined by the successful transfer of learning to workplace performance. Transfer of training refers to the extent to which knowledge and skills learned in a training context are used and sustained in the workplace (Baldwin & Ford, 1988; Kerins et al., 2021). Ensuring such transfer remains a persistent challenge in organisational learning and human resource development (Baldwin & Ford, 1988). This study aligns with Sustainable Development Goal 4 (Quality Education) and 8 (Decent Work and Economic Growth) by investigating how digitally mediated workplace learning can enhance workforce competence, support lifelong learning, and contribute to sustainable organisational development.

Over the last two decades, research on workplace e-learning transfer has expanded across a variety of disciplines, including management, education, information systems, and psychology. Scholars have investigated the human traits, motivational factors, instructional design aspects, and organisational support mechanisms that influence transfer outcomes (Abd Razak & Zahidi, 2024; Abiddin, 2021; AL-Mottahar et al., 2021; Heim et al., 2017). Simultaneously, the advent of digital platforms has added additional variables, including virtual cooperation, online engagement, and technology acceptability. These innovations have expanded the field's conceptual complexity. Although empirical investigations continue to be conducted, the literature remains divided across theoretical viewpoints and methodological techniques. A rigorous synthesis is thus required to clarify the conceptual structure and evolutionary trajectory of this study domain.

Bibliometric analysis offers a rigorous approach for mapping the evolution of scientific knowledge and identifying influential contributions within a field (Szomszor et al., 2021). By analysing publication patterns, citation networks, and keyword co-occurrence structures, bibliometric techniques enable researchers to uncover thematic clusters and research trends (Zupic & Čater, 2015). Such techniques are especially useful in interdisciplinary fields where

conceptual boundaries are blurred. In the context of workplace e-learning transfer, bibliometric mapping might indicate dominating research streams as well as underexplored topics. It can also identify leading publications, writers, and institutional contributors who influence the debate. This technique can provide a clearer grasp of the field's progression and emerging directions (Aria & Cuccurullo, 2017).

This study aims to trace the evolution of workplace e-learning transfer research through a comprehensive bibliometric and thematic review of 236 publications indexed in Scopus between 2003 and 2026. Specifically, it examines publication growth, citation performance, and collaborative patterns within the global research landscape. The analysis discovers important theme clusters that shape the field's intellectual architecture. In addition, it examines existing theoretical frameworks and highlights those that are neglected. By combining these ideas, the study fills existing research gaps and suggests a structured agenda for future research. Ultimately, this review helps to further theory development and reinforce evidence-based practice in digitally mediated workplace learning environments. This study provides significant additions to the workplace e-learning transfer literature. First, by conducting a comprehensive bibliometric and thematic analysis of studies published between 2003 and 2026, it provides a systematic mapping of the intellectual structure and historical development of workplace e-learning transfer research, an area that remains scattered across education, management, and information systems disciplines. Second, the study goes beyond descriptive bibliometric indicators by interpreting thematic clusters and revealing structural fragmentation between learner-centred, instructional, technological, and organisational perspectives. Third, by synthesising these clusters, this review advances a process-oriented and multilevel understanding of workplace e-learning transfer, highlighting the central role of organisational learning and knowledge management mechanisms. Finally, the study articulates a future research agenda aimed at addressing under-integrated themes and strengthening theoretical coherence in digitally mediated workplace learning research.

The structure of the paper is as follows. Section 1 introduces the study and outlines its background and objectives. Section 2 elaborates on the methodology and protocols used in the bibliometric analysis. Section 3 presents a descriptive analysis of the publications and citations related to the study's performance. Section 4 discusses the research clusters identified in the analysis. Section 5 explores potential future research directions, and Section 6 concludes the study.

Method

Methodology and Protocol

Bibliometric analysis is applied as the main analysis tool in this study. This analysis procedure was guided through a partial Preferred Reporting Items in Systematic Review and Meta-Analysis (PRISMA) protocol. The original PRISMA protocol contains four main phases: identification, screening, exclusion, and inclusion. However, this study applied only the identification stage of the PRISMA protocol, as the primary objective was to generate a comprehensive dataset suitable for large-scale bibliometric mapping rather than content-based inclusion or exclusion. Previous studies have noted that screening and eligibility stages are more appropriate for systematic literature reviews or meta-analyses, whereas bibliometric

analyses benefit from broader data inclusion to capture intellectual structure and thematic diversity (Aria & Cuccurullo, 2017; Donthu et al., 2021).

The application of a PRISMA-guided approach in this study was intended to enhance the transparency and reproducibility of the bibliometric data collection process (Sarkis-Onofre et al., 2021). In contrast to systematic literature reviews, which strive to synthesise evidence through rigorous screening and eligibility assessment, bibliometric studies seek to capture the larger intellectual structure of a study domain (Ellegaard & Wallin, 2015). Therefore, the identification stage was prioritised to ensure thorough coverage of important articles while reducing the danger of excluding influential contributions. This method is congruent with current bibliometric review techniques, which prioritise dataset completeness for network mapping, citation analysis, and thematic research (Donthu et al., 2021).

Data Collection

The bibliometric metadata sets are obtained and collected mainly from the Scopus database. This data collection only involves the identification phase in the PRISMA protocol (Donthu et al., 2021). The bibliographic data were retrieved from the Scopus database, selected due to its broad multidisciplinary coverage and rigorous indexing standards, which enhance reliability and reproducibility in bibliometric research. The search was conducted using a structured Boolean query applied to the Title–Abstract–Keyword (TITLE-ABS-KEY) fields to ensure conceptual relevance while maintaining precision. The search string combined three core constructs: (1) digital learning modalities (“e-learning,” “elearning,” “online learning,” “digital learning”); (2) transfer-related concepts (“training transfer,” “learning transfer,” “transfer of training,” “knowledge transfer”); and (3) workplace context descriptors (“workplace,” “workplace,” “employee,” “organisation,” “organisational,” “human resource development”). The Boolean operator AND was used to intersect these three conceptual domains, ensuring that retrieved documents addressed all dimensions simultaneously, while OR was employed within each domain to capture terminological variations and spelling differences. Restricting the query to TITLE-ABS-KEY fields enhanced specificity by focusing on publications in which the core constructs were central rather than peripheral. The search yielded 236 documents published between 2003 and 2026, which were subsequently exported for bibliometric analysis.

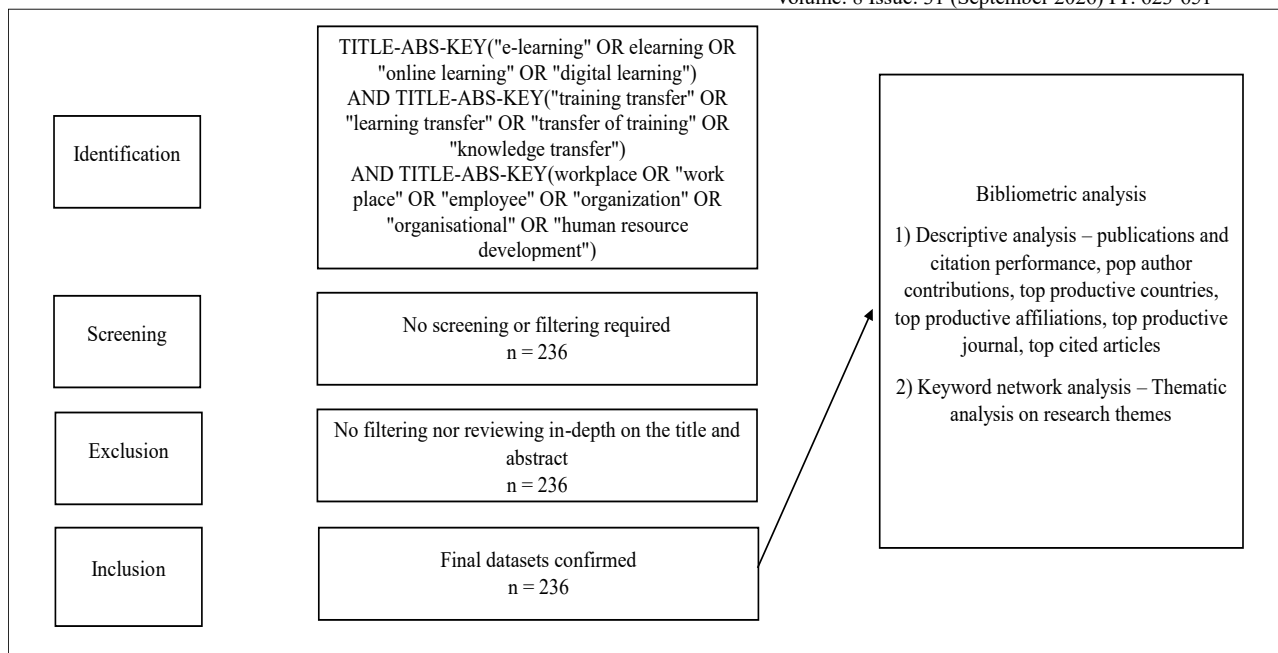


Figure 1: Bibliometric Analysis Protocol Guided By PRISMA Flow

Results and Findings

This section describes the bibliometric findings in workplace e-learning training transfer regarding publication and citation performances, top author contributions, productive countries, productive affiliations, productive journals, and top-cited articles.

Publication and Citation Performances

Table 1 summarises overall publications and citation performances in workplace e-learning training transfer studies for 23 years from 2003 to 2026. Overall, 236 documents were published, and 1708 citations were received about workplace e-learning training transfer studies. The average statistic shows an impressive record, with 74.26 citations per year, 7.24 average citations per document, and 813.48 citations per author. The h-index and g-index also performed well, with 21 and 36, respectively.

Table 1: Summary Of Overall Publications And Citation Performances In Workplace E-Learning Training Transfer Studies

Publication years	2003-2026
Citation's years	23 (2003-2026)
Papers	236
Citations	1708
Average citations per year	74.26
Average citations per document	7.24
Average citations per author	813.48
Number of papers per author	99.14

Number of authors per paper	2.76
h_index	21
g_index	36

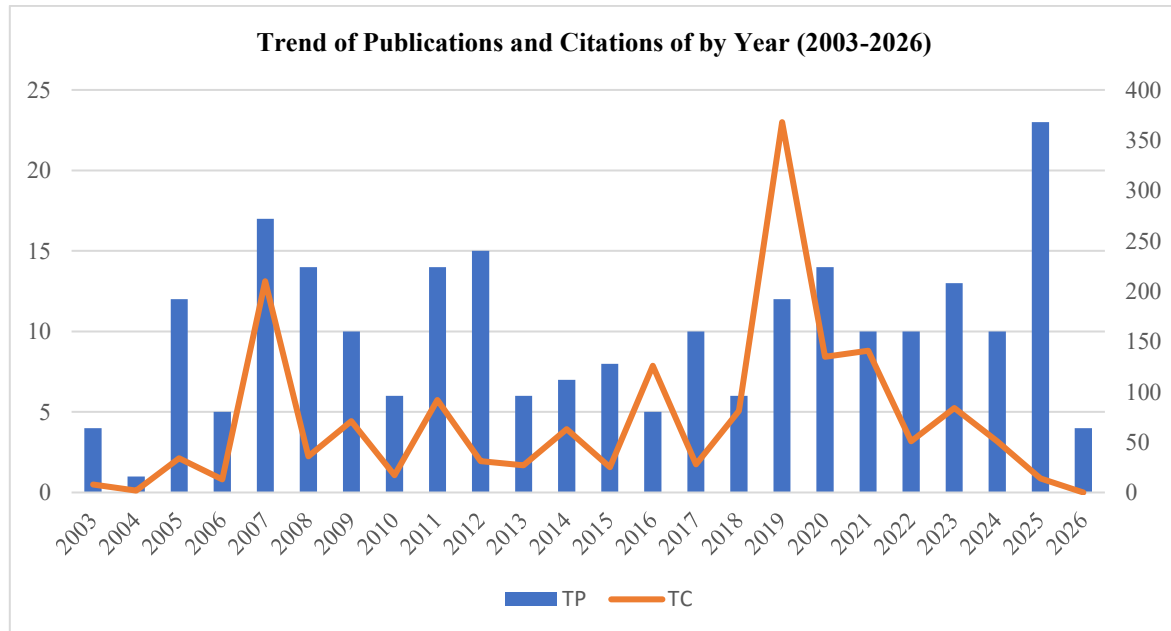


Figure 2: Publication and Citation Performances in Workplace E-learning Training Transfer Studies (2003-2026)

*TP = Total Publication; TP = Total Citation

A descriptive statistical analysis was performed to examine the annual trends in publications (TP) and citations (TC). As shown in Figure 1, scholarly output on the topic remained relatively modest between 2003 and 2008, reflecting the early developmental stage of the field. A more consistent pattern of publication activity appeared from 2009 onwards, with annual outputs generally ranging between 5 and 15 papers. A noticeable upward trend emerged after 2015, culminating in a substantial peak in 2019 and again in 2024, the latter representing the highest publication count in the dataset. Although a decline is visible in 2026, this is expected because the year is incomplete. Citation patterns show a different trajectory. Total citations remained low in the early years but began increasing sharply from 2006 onwards, with a major spike occurring in 2019. This exceptionally high citation count indicates the presence of highly influential publications during that period. Following 2019, citations gradually declined despite increasing publication numbers. This decline is typical in bibliometric patterns, as newly published articles require time to accumulate citations. Overall, the field demonstrates a steady and sustained growth in research output, particularly in the last decade, while citation patterns highlight the time-dependent nature of academic impact, with older publications receiving more cumulative citations than recent ones. Overall, these trends suggest that workplace e-learning transfer research has matured gradually rather than experiencing abrupt paradigm shifts, indicating incremental theoretical development alongside technological change.

Most Cited Article

A citation analysis was performed to determine the most influential contributions in the knowledge transfer and e-learning literature. The top 20 articles show strong citation performance, ranging from 28 to 169 citations. Based on the Table 2, the most cited article is by Maity (2019) titled "Identifying opportunities for artificial intelligence in the evolution of training and developmental practices", which received 169 citations (24.14 per year), demonstrating heightened scholarly interest in AI-driven training innovation. The second most cited article is by Abidi et al. (2019), whose study on virtual reality-based manufacturing training accumulated 133 citations (19 per year), highlighting the influence of immersive technologies on learning research. Following this, Chen & Hsiang (2007) received 78 citations (4.11 per year) for their work on critical success factors in knowledge-community e-learning. Mariano & Awazu (2016) recorded 76 citations (3.76 per year) with their review of knowledge management artefacts. Similarly, Park & Wentling (2007) received 67 citations (3.54 per year) for examining factors that influence transfer of training in workplace e-learning. Maier & Schmidt (2007) also contributed significantly with 63 citations (3.32 per year) on integrating e-learning and knowledge management processes. More recent works by Saide & Sheng (2021) (61 citations; 12.2 per year) and Ahmad et al. (2018) (59 citations; 7.38 per year) reflect growing attention to digital learning and sustainability-focused e-learning. Overall, while several foundational contributions date back to the mid-2000s, most high-impact publications were produced between 2015 and 2021. This pattern indicates a period of accelerated theoretical development and technological advancement, particularly in AI, VR, and digital learning systems supported by consistent citation rates that demonstrate the ongoing relevance of these studies to contemporary training and knowledge transfer practices. This pattern indicates that high-impact contributions in workplace e-learning transfer is more likely to be anchored in workplace learning and organisational development journals rather than technology-centric conference outlets.

Table 2 Most Cited Article

No.	Authors	Title	Total Citation	Cites Per Year	Cites Per Author
1	Maity (2019)	Identifying opportunities for artificial intelligence in the evolution of training and development practices	169	24.14	169
2	Abidi et al. (2019)	Assessment of virtual reality-based manufacturing assembly training system	133	19	27
3	Chen & Hsiang (2007)	A study on the critical success factors for corporations embarking on knowledge community-based e-learning	78	4.11	39
4	Mariano & Awazu (2016)	Artifacts in knowledge management research: a systematic literature review and future research directions	76	7.6	38

5	Park & Wentling (2007)	Factors associated with transfer of training in workplace e-learning	67	3.53	34
6	Maier & Schmidt (2007)	Characterizing knowledge maturing: A conceptual process model for integrating e-learning and knowledge management	63	3.32	32
7	Saide & Sheng (2021)	Knowledge exploration-exploitation and information technology: crisis management of teaching-learning scenario in the COVID-19 outbreak	61	12.2	31
8	Ahmad et al. (2018)	Relationship modeling of critical success factors for enhancing sustainability and performance in E-learning	59	7.38	15
9	Lantta et al. (2014)	Knowledge transfer from an e-learning course to clinical practice	48	4	12
10	Wilkesmann & Wilkesmann (2011)	Knowledge transfer as interaction between experts and novices supported by technology	45	3	23
11	Joo et al. (2011)	Investigating the structural relationships among organisational support, learning flow, learners' satisfaction and learning transfer in corporate e-learning	41	2.73	14
12	Pokrovskaja et al. (2021)	Digital communication tools and knowledge creation processes for enriched intellectual outcome-experience of short-term E-learning courses during pandemic	34	6.8	7
13	Linjalone et al. (2020)	Connecting universities with entrepreneurship through digital learning platform: functional requirements and education-based knowledge exchange activities	34	5.67	11
14	Harris (2009)	Improving tacit knowledge transfer within SMEs through e-collaboration	31	1.82	31
15	Atack & Luke (2008)	Impact of an online course on infection control and prevention competencies	28	1.56	14
16	Al-Sous et al. (2023)	Integrated e-learning for knowledge management and its impact on innovation performance among Jordanian manufacturing sector companies	28	9.33	6

17	Tessier & Dalkir (2016)	Implementing Moodle for e-learning for a successful knowledge management strategy	24	2.4	12
18	Nathanael et al. (2016)	Development and Evaluation of a Virtual Reality Training System Based on Cognitive Task Analysis: The Case of CNC Tool Length Offsetting	23	2.3	6
19	Deakin (2009)	The IntelCities Community of Practice: The eGov Services Model for Socially Inclusive and Participatory Urban Regeneration Programs	23	1.35	23
20	Cegarra-Navarro & Sabater-Sánchez (2005)	E-learning: organizational requirements for successful feedback learning	22	1.05	11

Countries With The Highest Number Of Articles

The analysis of publication distribution by country reveals that research on knowledge transfer and e-learning is geographically diverse, with notable concentrations in Europe, Asia, and North America. As shown in Table 3, Germany emerges as the most productive country, contributing 25 publications (16.56%), indicating its strong research presence in organisational learning, knowledge management, and technological innovation. The United Kingdom ranks second with 19 publications (12.58%), reflecting its long-standing academic engagement with training, education technology, and human resource development. China (17 publications; 11.26%) and the United States (15 publications; 9.93%) also feature prominently, highlighting the global spread of research interests, particularly in technology-enhanced learning and digital knowledge systems. Other European countries such as Spain (11 publications), Russia (8), Italy (7), Switzerland (7), Greece (6), Austria, Belgium, Finland, Ireland, and Poland (each with 5) collectively contribute a substantial share, demonstrating Europe's leadership in knowledge transfer scholarship. Several Asia-Pacific and Middle Eastern countries also display meaningful participation. India (9 publications; 5.96%), Australia and Canada (both 7 publications), Saudi Arabia (5), and Indonesia (4) reflect the expanding interest in digital learning and organisational knowledge practices across these regions. Malaysia, with 4 publications (2.65%), represents a growing but emerging research footprint. Overall, the distribution suggests that while Western countries dominate the field in terms of output, there is increasing engagement from Asia and the Middle East. This demonstrates a broadening global interest in knowledge transfer, e-learning, and technology-supported training, particularly as organisations worldwide adopt digital learning solutions.

Table 3 Countries With The Most Publications

No.	Country	Total Publication	Percentage 100%
1	Germany	25	16.55629
2	United Kingdom	19	12.58278
3	China	17	11.25828

4	United States	15	9.933775
5	Spain	11	7.284768
6	India	9	5.960265
7	Russia	8	5.298013
8	Australia	7	4.635762
9	Canada	7	4.635762
10	Italy	7	4.635762
11	Switzerland	7	4.635762
12	Greece	6	3.97351
13	Austria	5	3.311258
14	Belgium	5	3.311258
15	Finland	5	3.311258
16	Ireland	5	3.311258
17	Poland	5	3.311258
18	Saudi Arabia	5	3.311258
19	Indonesia	4	2.649007
20	Malaysia	4	2.649007

Journals with The Highest Number of Articles and Citations

Table 4 indicates that Journal of Workplace Learning demonstrates the strongest scholarly impact among the listed outlets. Although it has only three publications, these articles have accumulated 70 citations, resulting in 2.26 citations per publication, the highest average in the group. This suggests that while its output volume is modest, its contributions are comparatively influential within the workplace e-learning transfer domain. In contrast, Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics records the highest number of publications (5), but with 17 citations overall, yielding a lower average of 0.55 citations per publication. This pattern reflects higher productivity but more moderate per-article impact. Smart Innovation Systems and Technologies present a relatively balanced profile, with four publications generating 32 citations and an average of 1.03 citations per publication, indicating reasonable visibility and influence. Several conference-oriented outlets, including Ceur Workshop Proceedings, Communications in Computer and Information Science, and the Elearning and Software for Education Conference, show limited citation performance despite multiple publications, each averaging below 0.25 citations per article. Notably, the Proceedings of the International Conference on e-Learning (ICEL) records three publications with no citations, underscoring the generally lower citation impact associated with conference proceedings. Overall, the findings suggest that while technology-focused conference series contribute substantially to publication volume, journals grounded in workplace learning and organisational development exhibit stronger citation influence.

Table 4 Journals with The Highest Number of Articles and Citations

No.	Journal Title	Total publication (TP)	Total Citations (TC)	Citations per Publication (TC/TP)
1	Lecture Notes in Computer Science Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics	5	17	0.548387
2	Smart Innovation Systems and Technologies	4	32	1.032258
3	Ceur Workshop Proceedings	3	6	0.193548
4	Communications in Computer and Information Science	3	1	0.032258
5	Elearning and Software for Education Conference	3	7	0.225806
6	Journal of Workplace Learning	3	70	2.258065
7	Lecture Notes in Networks and Systems	3	5	0.16129
8	Proceedings of the International Conference on e-Learning, ICEL	3	0	0
9	ACM International Conference Proceeding Series	2	6	0.193548
10	IEEE Global Engineering Education Conference Educon	2	10	0.322581

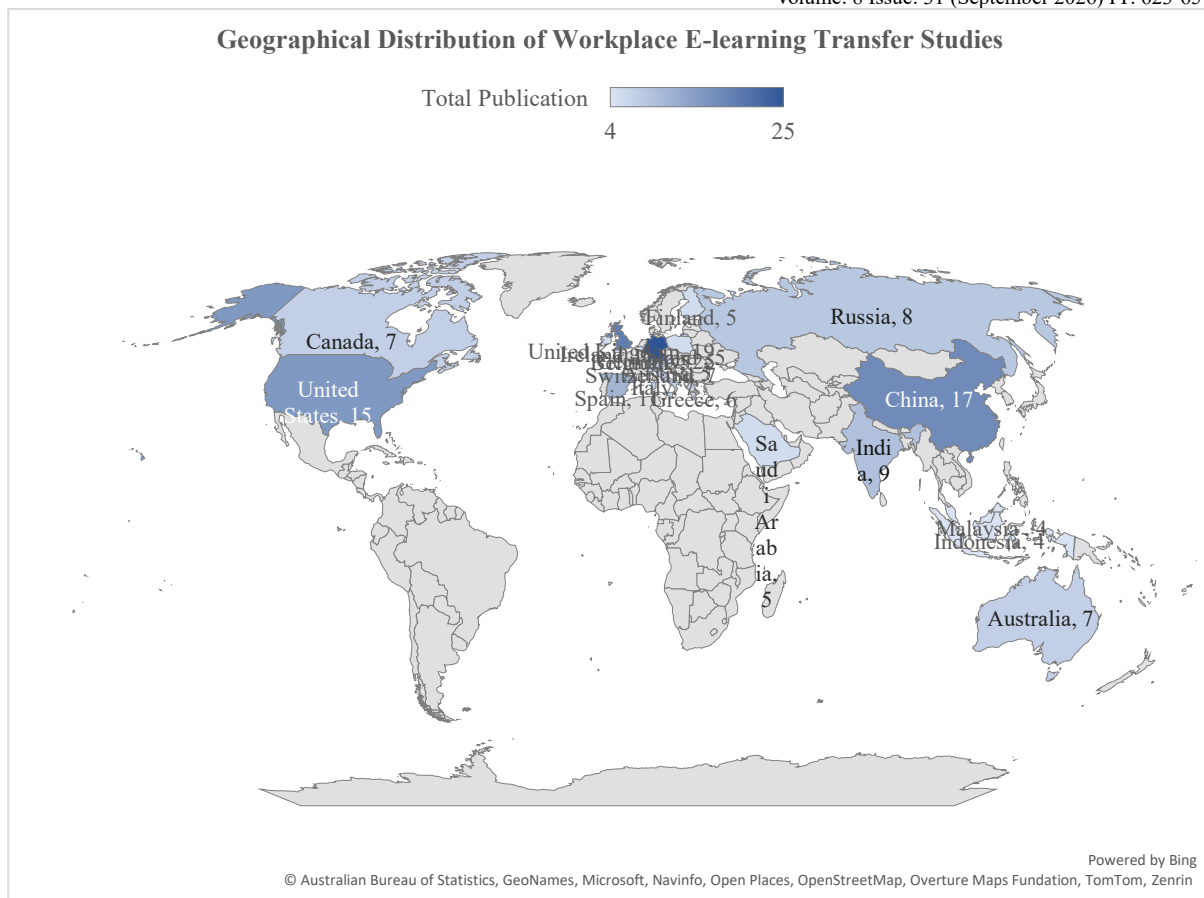


Figure 3: Geographical Distribution of Workplace E-learning Transfer Studies around the World

Affiliations with The Highest Number Of Articles

The affiliation analysis provides insight into the institutional distribution and concentration of research productivity within the workplace e-learning transfer domain. Among the top contributing institutions, the Organisation Mondiale de la Santé emerges as the most productive affiliation, with six publications representing 18.18% of total output among the leading ten institutions. This finding suggests that workplace e-learning transfer research is not confined to higher education institutions but also extends to international policy and health-oriented organisations, reflecting the applied and cross-sectoral relevance of the field. The University of Macau ranks second with five publications (15.15%), indicating a strong institutional presence in Asia. A cluster of European and Asian universities each contributed three publications (9.09%), including University of Galway, The Hong Kong Polytechnic University, Julius-Maximilians-Universität Würzburg, Università degli Studi di Napoli Federico II, KU Leuven, and Universidad de Sevilla. This distribution reflects moderate institutional dispersion rather than dominance by a single academic hub. Institutions such as Universiteit van Amsterdam and Chinese University of Hong Kong contributed two publications each (6.06%), further reinforcing the international character of the field. Overall, the relatively small publication counts per institution suggest that workplace e-learning transfer research remains fragmented across institutions, indicating opportunities for stronger inter-

institutional collaboration and the development of more concentrated research centres in this domain.

Table 5 Affiliations with The Highest Number of Publications

No.	Affiliation	Total Publication (TP)	Percentage (100%)
1	Organisation Mondiale de la Santé	6	18.18181818
2	University of Macau	5	15.15151515
3	University of Galway	3	9.090909091
4	The Hong Kong Polytechnic University	3	9.090909091
5	Julius-Maximilians-Universität Würzburg	3	9.090909091
6	Università degli Studi di Napoli Federico II	3	9.090909091
7	KU Leuven	3	9.090909091
8	Universidad de Sevilla	3	9.090909091
9	Universiteit van Amsterdam	2	6.060606061
10	Chinese University of Hong Kong	2	6.060606061

Authors with The Highest Number Of Papers

The author productivity analysis reveals a relatively dispersed authorship structure within the workplace e-learning transfer domain. The most prolific contributor is Hanna Utunen (Utunen, H.), with six publications representing 17.14% of the output among the top ten authors. This level of contribution suggests a leading role in shaping specific thematic strands within the field. Ka Hou Vat (Vat, K.H.) follows with five publications (14.29%), indicating sustained scholarly engagement. A second tier of contributors includes Miriam Attias, Gaya Gamhewage, and Ndeye Ndiaye, each with four publications (11.43%). Their comparable output suggests collaborative or thematically aligned research streams, possibly linked to institutional or project-based networks. Authors such as Ronan George *and* Alexander Tokar contributed three publications each (8.57%), reflecting moderate but consistent productivity. The remaining authors, Vincenzo Capone, Mark Deakin, and Ludmila V. Glukhova, each produced two publications (5.71%). Overall, the relatively small number of publications per leading author indicates that the field does not appear to be dominated by a single highly prolific scholar. Instead, the pattern reflects distributed authorship, which is characteristic of emerging or interdisciplinary research domains where contributions are spread across multiple research groups rather than concentrated within a single epistemic community.

Table 6 Authors With The Highest Number Of Articles

No.	Author Name	Total Publication	Percentage 100%
1	Utunen, H.	6	17.14286
2	Vat, K.H.	5	14.28571
3	Attias, M.	4	11.42857

4	Gamhewage, G.	4	11.42857
5	Ndiaye, N.	4	11.42857
6	George, R.	3	8.571429
7	Tokar, A.	3	8.571429
8	Capone, V.	2	5.714286
9	Deakin, M.	2	5.714286
10	Glukhova, L.V.	2	5.714286

Top Authors Keyword Analysis

Figure 4 presents the keyword co-occurrence network that illustrates the thematic landscape of workplace e-learning transfer research. The map shows two dominant clusters. The purple cluster focuses on foundational HRD themes such as learning, transfer, training, knowledge, and process, reflecting research that examines how learning is acquired and applied in workplace settings. The green cluster highlights organisational and technology-oriented themes such as performance, application, management, innovation, and information system, indicating studies that connect learning transfer to organisational outcomes and digital infrastructures. The dense cross-linkages, particularly around central terms like learning, transfer, and process, reveal the increasingly integrated nature of the field, where authors combine HRD, management, and technological perspectives. These patterns suggest opportunities for future research to explore multilevel pathways that link training design, learner characteristics, and system features to transfer behaviour and performance. Scholars may also examine shifts in thematic emphasis over time to understand the evolution of the field. For practitioners, the network underscores the need to align learning design, organisational support, and technological tools to maximise transfer. The prominence of bridging terms also highlights potential for theory integration to better explain how digital learning translates into measurable organisational outcomes.



Figure 5 Network Mapping Analysis

Table 1 Cluster's Analysis Matrix

Cluster No.	Items (Labels) and Occurrences	No. of Items	Total Link Strengths	Total Occurrences	Interpretation
1. Learner and Workplace Context	adult (5), article (8), covid-19 (7), education (21), distance education (8), epidemiology (5) female (5), health care personnel (5), human (17), humans (13), internet (10), knowledge (11), learning (12), learning transfer (5), male (5), motivation (9), online learning (17), organisation and management (7), professional aspects (5), questionnaire (7), simulation (5), training (15), training transfer (7), workplace (7)	24	1424	216	This cluster represents adult learners in professional or health-related workplaces. It highlights learner demographics (adult, male, female), learning transfer, motivation, and training effectiveness, with a particular focus on health contexts such as healthcare personnel, epidemiology, and Covid-19.
2. Knowledge Management and Organisational Learning	communities of practice (6), e-learning (151), information systems (6), information technology (6), information use (10) knowledge acquisition (16), knowledge based systems (11), knowledge management	20	2912	536	This cluster represents organisational knowledge processes, including acquisition, sharing, transfer, and management systems. It emphasizes how IT and online systems facilitate knowledge dissemination

	(105), knowledge organisation (16), knowledge sharing (12), knowledge transfer (106), knowledge-sharing (12), learning organisation s (5), learning systems (33), online systems (6), organisational (5), organisational learning (13), sustainable development (7), transfer of knowledge (5), world wide web (5)				and enhance learning within organisation s.
3. Educational Technology and Instructional Design	computer aided instruction (17), curricula (22), e-learning (13), economic and social effects (6), education computing (7), educational institutions (5), engineering education (25), information and communication technologies (5), multimedia systems (5), network security (5), online education (5), students (20), teaching (27), technology	15	1208	173	This cluster represents technology-mediated learning and instructional design, including computer-aided instruction, e-learning, multimedia systems, and engineering education. It focuses on designing and implementing structured learning programs through technological tools.

	transfer (6), transfer learning (5)				
4. Digital Learning Environments and Social Interaction	information management (13), personnel training (28), social networking (online) (7), societies and institutions (8), virtual reality (18)	4	403	74	This cluster represents the role of digital platforms and social technologies in shaping learning experiences. It includes social networking, virtual reality, information management, and institutional learning, highlighting collaborative and immersive learning processes.
5. Knowledge Economy and Dissemination	economics (6) information, dissemination (5), personnel (7), tacit knowledge (5)	3	143	23	This cluster represents the economic and strategic aspects of knowledge use, including information dissemination, personnel development, tacit knowledge, and organisational performance. It reflects the broader impact of knowledge management on economic outcomes and HR strategies.

Learner and Workplace Context

Cluster 1 comprises 24 items, with a total link strength of 1424 and 216 total occurrences, indicating a well-established and moderately dense thematic structure. The dominant keywords, including education, learning, training, online learning, human, workplace, learning transfer, and training transfer, demonstrate a strong focus on adult learners and the application of learning outcomes in organisational settings (Baldwin & Ford, 1988). The co-occurrence of demographic terms (adult, male, female) with contextual terms (healthcare personnel, Covid-19, epidemiology) suggests that this research stream emphasises learner diversity and situational influences on training effectiveness. From a bibliometric perspective, the relatively high number of items and substantial link strength reflect conceptual cohesion, while its thematic proximity to organisational and learning-related terms highlights its integrative role between individual-level and workplace-level learning research. The frequency of keywords related to both learning processes and contextual conditions indicates balanced attention to inputs and outcomes of training. Additionally, the cluster's size suggests sustained scholarly engagement rather than short-term or trend-driven interest.

Knowledge Management and Organisational Learning

Cluster 2 consists of 20 items but displays the highest total link strength (2912) and largest number of occurrences (536), indicating a dominant and highly interconnected research core. Key terms such as e-learning, knowledge management, knowledge transfer, knowledge sharing, and learning systems occur most frequently, reflecting the centrality of organisational knowledge processes in the literature. The strong co-occurrence among these keywords suggests a consolidated intellectual structure where learning is conceptualised as a system-enabled organisational capability. Bibliometrically, the high link strength signals intensive cross-referencing among studies, positioning this cluster as the theoretical backbone that connects technological, organisational, and learning-related research streams. The dominance of this cluster also explains why several learning-related concepts appear across multiple clusters. Its central position implies that other themes are conceptually built upon or influenced by this foundational knowledge-oriented perspective.

Educational Technology and Instructional Design

Cluster 3 includes 15 items, with a total link strength of 1208 and 173 occurrences, indicating a stable but more specialised thematic area. Prominent keywords such as teaching, curricula, students, computer-aided instruction, and engineering education show that this cluster is primarily concerned with structured instructional design and technology-mediated education. Although terms like technology transfer and transfer learning are present, their lower occurrence suggests that transfer is addressed mainly at the pedagogical or instructional level rather than workplace application. From a bibliometric standpoint, the moderate link strength reflects clear thematic boundaries and strong internal consistency, while its relative separation from workplace-oriented keywords indicates limited integration with training transfer research. The concentration of education-focused terms suggests a discipline-specific knowledge base. This positioning indicates that the cluster contributes depth within educational contexts but, but less cross-domain linkage compared to more organisationally oriented clusters.

Digital Learning Environments and Social Interaction

Cluster 4 is composed of 4 items, with a total link strength of 403 and 74 occurrences, reflecting a smaller but coherent thematic grouping. Keywords such as virtual reality, social networking (online), information management, and personnel training indicate a focus on interactive and immersive digital environments. The lower number of items and link strength suggests that this is an emerging research cluster, rather than a fully developed stream. Bibliometrically, the limited co-occurrence structure points to early-stage thematic consolidation, with research concentrating on a narrow set of technologically advanced learning environments. The relatively focused keyword set implies early conceptual agreement among scholars. However, the cluster's peripheral position indicates that these technologies are still gaining integration within mainstream learning and training transfer research.

Knowledge Economy and Dissemination

Cluster 5 contains only 3 items, with a total link strength of 143 and 23 total occurrences, making it the smallest and least connected cluster. The presence of keywords such as 'tacit knowledge', 'information dissemination', 'economics', and 'personnel' reflects a macro-level focus on the strategic and economic dimensions of knowledge. The low frequency and weak interconnections indicate that this perspective remains peripheral within the overall research network. From a bibliometric perspective, the sparse co-occurrence pattern suggests fragmented exploration, highlighting a lack of integration between economic considerations and dominant learning themes. The limited number of items further indicates that research in this area is still exploratory. This positioning suggests significant potential for future integration with more central knowledge management and learning clusters.

Taken together, the five clusters reflect a multilevel research landscape in which workplace e-learning transfer has been examined from individual, instructional, technological, organisational, and economic perspectives. However, the distribution of link strengths and thematic separation among clusters indicates that these perspectives have evolved largely in parallel rather than in an integrated manner. In particular, organisational learning and knowledge management research occupies a central but under-exploited position that connects learner-level conditions with broader organisational outcomes.

Integrative Conceptual Synthesis

Synthesising the five bibliometric clusters reveals a multilevel and process-oriented structure underlying workplace e-learning transfer research. Cluster 1 (Learner and Workplace Context) captures individual-level and situational antecedents that shape readiness and motivation for transfer. Clusters 3 and 4 (Educational Technology and Instructional Design; Digital Learning Environments and Social Interaction) represent the instructional and technological mechanisms through which learning experiences are designed and mediated. Cluster 2 (Knowledge Management and Organisational Learning) functions as the central integrative layer, linking individual learning enactment with organisational knowledge processes. Finally, Cluster 5 (Knowledge Economy and Dissemination) reflects downstream strategic and economic outcomes, although it remains weakly connected within the literature. Taken together, these clusters suggest that workplace e-learning transfer is best conceptualised as a dynamic, multilevel process in which learning inputs, instructional and digital systems, and

organisational mechanisms interact to generate sustained individual and organisational value (Gegenfurtner et al., 2020; Testers et al., 2020).

Discussion

Building on the integrative conceptual synthesis derived from the cluster analysis, the discussion interprets the bibliometric findings as evidence of a multilevel and weakly integrated research landscape, in which learner-centric, technological, and organisational perspectives have evolved largely in parallel rather than as a coherent system (Donthu et al., 2021; Zupic & Čater, 2015). This study sought to map and interpret the intellectual structure of workplace e-learning transfer research through bibliometric and thematic analysis. The findings reveal a field that has expanded steadily over the past two decades but remains conceptually fragmented despite thematic richness. While a wide array of constructs and perspectives has been explored, the bibliometric structure indicates uneven theoretical integration across levels of analysis, a pattern also noted in broader HRD and management research (Blume et al., 2023).

The cluster analysis shows that research has historically been anchored in learner-level and contextual explanations of transfer, as reflected in Cluster 1. This cluster's emphasis on learner characteristics, motivation, and immediate workplace conditions suggests that e-learning transfer has predominantly been conceptualised as an individual-centred outcome. Such an orientation is consistent with early training transfer and adult learning theories, which prioritised behavioural application and situational support (Baldwin & Ford, 1988; Burke & Hutchins, 2007). However, the sustained dominance of this perspective also indicates a tendency to treat transfer as a short-term, discrete event rather than a process embedded within broader organisational systems.

In contrast, Cluster 2 emerges as the most structurally dominant and interconnected cluster, highlighting the growing influence of knowledge management and organisational learning perspectives. The strong co-occurrence of knowledge-related constructs suggests an important theoretical shift: workplace e-learning transfer is increasingly understood as part of an organisational knowledge flow rather than merely an individual learning outcome. This shift reflects the maturation of the field and signals recognition that sustainable transfer depends on organisational mechanisms for knowledge integration, sharing, and reuse. This finding reinforces a growing body of literature that conceptualises transfer as an organisational learning process embedded within knowledge systems and routines rather than isolated individual behaviour (AL-Mottahar et al., 2021).

Despite this progress, the bibliometric patterns reveal clear theoretical discontinuities. Research on educational technology and instructional design (Cluster 3) remains largely isolated from discussions of workplace application and organisational learning. Although instructional quality and technological features are extensively examined, they are rarely conceptualised as drivers of long-term transfer or organisational performance. This separation limits understanding of how training design contributes to sustained learning application beyond the training context (Burke & Hutchins, 2007; Dachner et al., 2021).

Similarly, digital learning environments and social interaction technologies (Cluster 4) represent an emerging but under-integrated stream (Saad Alrabadi et al., 2023). While immersive and collaborative technologies such as virtual reality and social platforms hold significant potential to support experiential learning and peer-based knowledge exchange, they have yet to be fully embedded within dominant transfer theories. Their peripheral position in the network suggests that technological innovation is advancing faster than theoretical integration (Gegenfurtner et al., 2020). At the macro level, knowledge economy and dissemination perspectives (Cluster 5) remain marginal. Although these studies acknowledge the strategic and economic value of knowledge transfer, they rarely articulate clear process-level linkages between e-learning activities and organisational outcomes. As a result, the literature often assumes value creation rather than explaining how it emerges through learning and transfer mechanisms.

Overall, the discussion highlights that the central challenge facing workplace e-learning transfer research is not the absence of relevant themes, but the lack of cohesive, integrative theorisation that connects individual learning, instructional design, digital environments, organisational processes, and strategic outcomes. Addressing this fragmentation is essential for advancing theory development in digitally mediated workplace learning.

From a theoretical standpoint, several known frameworks offer potential groundwork for unifying these disparate research areas. First, the Learning Transfer System Inventory (LTSI) provides a comprehensive lens for evaluating how learner characteristics, training design, and work environment elements all influence transfer outcomes (Holton III, 1996). Second, social exchange theory outlines how organisational and supervisory support encourages employees to use newly learned knowledge through reciprocal exchange interactions (Blau, 1958). Third, organisational learning theory offers a larger viewpoint by explaining how individual learning transforms into collective knowledge, organisational routines, and sustained performance outcomes (Argyris, 1996). Together, these theories provide complementary explanations that can help to construct more integrated and multidimensional models of workplace e-learning transfer.

Future Research Directions

The following study directions prioritise theoretical integration and process-oriented explanations of workplace e-learning transfer over incremental extensions within individual research streams. Future study directions for workplace e-learning transfer are offered, based on bibliometric findings and cluster synthesis.

Development of Integrative and Multilevel Frameworks

Future research should focus on integrative models that link learner-level variables, training design characteristics, digital learning environments, and organisational knowledge processes in a cohesive framework. Multilevel and process-oriented methods can bridge the micro-macro split in existing literature and provide a more thorough explanation of how e-learning leads to sustained workplace success. Researchers should develop conceptual models specifying the temporal pathways through which individual learning translates into collective organisational outcomes. Such models would benefit from incorporating moderating variables, including

organisational culture, leadership support, and technological infrastructure, which may influence transfer at different stages.

Linking Instructional Design to Transfer and Performance Outcomes

There is a definite need for empirical research that specifically investigates how instructional design aspects influence workplace transfer, rather than focusing solely on engagement or satisfaction outcomes. Future study should examine how alignment between learning objectives, occupational needs, and post-training support impacts behaviour and performance over time. Researchers should investigate the differential effects of various instructional strategies, such as scenario-based learning and adaptive feedback, on transfer outcomes across occupational contexts. Comparative studies between traditional and digitally enhanced designs could reveal which pedagogical approaches are most effective for sustaining long-term behavioural change.

The Role of Digital and Social Learning Technologies

As digital learning tools evolve, future research should use immersive and social technologies as accelerators or regulators of transfer, rather than isolated interventions. Longitudinal and experimental designs may reveal more about how these tools promote knowledge internalisation, cooperation, and long-term application in the workplace. Scholars should examine specific technological features, such as real-time collaboration tools and immersive simulations, that most effectively facilitate cognitive and social processes underpinning transfer. Research is also needed to understand potential risks of over-reliance on digital technologies, including information overload and technostress, which may impede rather than enhance transfer outcomes.

From Learning Transfer to Organisational Value Creation

Future study should look beyond individual and departmental outcomes to examine the organisational-level and strategic implications of e-learning transfer (Abd Razak & Zahidi, 2025). Linking transfer processes to measures such as innovation capability, productivity, and knowledge retention will increase the field's practical relevance while also aligning transfer research with larger knowledge economy discourse. These directions emphasise the necessity for theory-driven, rigorous research that incorporates learning, technological, and organisational perspectives.

Theory-Driven Research Development

Future research should go beyond descriptive analyses of workplace e-learning transfer by establishing strong theoretical frameworks. The Learning Transfer System Inventory (LTSI) can be used to investigate how learner, training, and workplace factors interact to affect transfer outcomes (Devos et al., 2007). Social Exchange Theory can provide insights into the role of organisational, supervisory, and peer support in facilitating learning application (Afzal et al., 2019; Cropanzano and Mitchell, 2005). In addition, organisational learning theory provides a valuable framework for understanding how individual learning is entrenched, shared, and institutionalised within businesses (Zhang et al., 2022). Integrating these theoretical views may

help to generate more complete explanations of workplace e-learning transfer in digitally mediated learning environments.

Conclusion

This study presents a complete bibliometric and thematic review of workplace e-learning transfer studies published from 2003 to 2026. By examining publishing trends, citation structures, and theme clusters, the study provides a systematic overview of how the discipline has evolved, and its intellectual foundations are organised. Research on workplace e-learning transfer has increased in volume and scope, but theoretical development remains scattered. Learner-centric, instructional, technical, and organisational perspectives have grown independently rather than together. The bibliometric evidence emphasises the need for integrative techniques that bridge different disciplines and view transfer as a dynamic, multidimensional process. This study advances our understanding of workplace e-learning transfer by identifying dominating research streams, under-integrated topics, and conceptual gaps. The findings provide a solid platform for future theory development and empirical study, as well as assistance for scholars looking to create robust frameworks that explain how digital learning initiatives transfer into meaningful workplace and organisational results. This study reframes workplace e-learning transfer as a knowledge-driven process, laying the groundwork for future theory development and research on digitally mediated workplace learning.

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