CHAPTER ONE

Work-Integrated Learning in an AI-Driven Era: A Bibliometric Review of Research Themes and Emerging Trends

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How to cite this chapter: Shambare, B. (2026). Work-Integrated Learning in an AI-Driven Era: A Bibliometric Review of Research Themes and Emerging Trends. In C. T. Tsotetsi (Ed.), *Work-Integrated Learning in the Age of Artificial Intelligence: Equity, Innovation, and Partnerships for Bridging Theory and Practice* (pp. 1–16). ERRCD Forum. https://doi.org/10.38140/obp5-2026-01

Abstract: As artificial intelligence (AI) transforms the nature of learning and work, higher education faces an urgent challenge. The pertinent question is not whether AI will reshape Work-Integrated Learning (WIL), but rather how institutions can reimagine it for an AI-driven workplace. This reality has incited extensive academic interest, resulting in a global surge of WIL scholarship over the past decade. However, research at the intersection of WIL and AI lacks a coherent synthesis, leaving critical gaps in understanding how intelligent technologies redefine WIL. This chapter addresses this gap by presenting one of the first bibliometric mappings of WIL scholarship in AI-driven contexts. Drawing on 4,975 records from the Web of Science (2015-2025), the chapter examines publication trends, prolific contributors, citation impact, and thematic evolution. The findings reveal an inflection point post-2020, with an increase in publications signalling AI's role as a disruptive catalyst. Thematic analysis indicates a shift from traditional models of WIL practices towards a new paradigm centred on generative AI, virtual internships, and intelligent mentoring. While confirming the continued dominance of traditional WIL research hubs, the analysis highlights the rising influence of East Asian scholarship and a persistent underrepresentation of the Global South. The chapter identifies the convergence of WIL with educational technology research as forming an essential interdisciplinary core. This review underscores the necessity for future research to interrogate AI-integrated WIL models across diverse contexts. From a practical perspective, the findings advocate for the establishment of pedagogical and policy guidelines to support the integration of AI in WIL ecosystems.

Keywords: Work-Integrated learning, artificial intelligence, higher education, bibliometrics, text mining, thematic analysis.

1. Introduction

Work-Integrated Learning (WIL) has long been recognised as a cornerstone of higher education's engagement with the world of work, functioning as a bridge between academic knowledge and professional practice. Commonly operationalised through internships, cooperative education, practicals, and industry placements (Jackson & Cook, 2025; Zegwaard et al., 2023), WIL has played a central role in promoting graduate employability (Ferns et al., 2025),

professional identity formation (Hiratsuka, 2026), and work readiness (Wahyuningsih et al., 2025; Pretti et al., 2020). These models have historically relied on relatively stable assumptions regarding workplace roles, supervision, and the nature of professional expertise. While these approaches have been instrumental in aligning higher education with labour market needs, they are now being profoundly unsettled.

The accelerating diffusion of artificial intelligence (AI) across industries is reshaping contemporary work and, by extension, WIL. In this chapter, AI is conceptualised to encompass both the automation of routine and administrative tasks and the utilisation of generative and decision-support tools that mediate knowledge work, supervision, and professional judgement across professional fields such as education, business, engineering, and health. Within WIL, these developments are shifting learning from predominantly place-based, human-mediated models toward digitally enabled, hybrid, and algorithmically augmented forms of engagement (Sellberg & Lindwall, 2026; Wilson et al., 2022). In response, an emerging body of scholarship has begun to interrogate how WIL is being reconfigured in AI-mediated contexts, examining issues such as shifting employability skills (Rowe & Zegwaard, 2017; Safri et al., 2026), virtual internships (Wahyuni et al., 2026), intelligent tutoring systems (Bardach et al., 2025), learning analytics (Wahyuningsih et al., 2025), and simulation-based training environments (Sellberg & Lindwall, 2026; Wood et al., 2020). Collectively, this body of work signals a substantive transformation of WIL from predominantly place-based experiential learning to increasingly digital, hybrid, and algorithmically mediated forms of workplace engagement.

Despite the increasing scholarly interest, research on WIL in the AI era remains highly fragmented. Studies are scattered across various fields, including education (Wahyuningsih et al., 2025; Jackson et al., 2022), workforce development (Dean, 2023), educational technology (Wilson et al., 2022), and computer science (Mousavi et al., 2022). These studies often adopt discipline-specific perspectives and focus on isolated technologies or professional contexts. To date, existing literature reviews on WIL and technology have primarily concentrated on online, remote, or virtual placements in general (e.g., Areskoug Josefsson et al., 2024; Dlamini et al., 2023; Samson et al., 2025), with little attention given to the role of AI in WIL or to mapping the intellectual structure of this emerging field. There are very few, if any, studies that have provided a field-level bibliometric mapping of WIL research specifically addressing AI, including its key themes, knowledge clusters, and emerging fronts across disciplines. This lack of comprehensive synthesis hinders the building of cumulative knowledge and diminishes the ability of institutions and policymakers to respond strategically to AI-induced transformations in WIL.

Simultaneously, the integration of AI into professional environments has broadened WIL beyond traditional physical placements to include AI-mediated mentoring (Sellberg & Lindwall, 2026). For instance, AI-based analytics can monitor student performance in real time, transitioning supervisory practices from solely human mentorship to data-informed or AI-assisted feedback (Bardach et al., 2026). These developments raise critical questions regarding

authenticity, supervision, assessment, ethics, and the evolving role of human expertise in WIL—questions that fragmented or discipline-bound analyses alone cannot adequately address. Bibliometric analyses provide a robust means of tackling this challenge. Unlike narrative and systematic reviews, which are limited by their interpretive scope or restrictive inclusion criteria, bibliometric approaches allow for the examination of relational, structural, and evolutionary features of a research domain that remain largely inaccessible through other forms of synthesis (Donthu et al., 2021; Ellegaard & Wallin, 2015; Hood & Wilson, 2001). Such approaches facilitate the identification of influential contributors, dominant knowledge clusters, and emerging research fronts (Börner & Boyack, 2003; Kastrin & Hristovski, 2021), thereby illuminating how a research domain evolves conceptually and methodologically over time. In the context of WIL and AI, a bibliometric lens is particularly valuable given the interdisciplinary nature and rapid expansion of the field.

Against this backdrop, this chapter presents a comprehensive bibliometric mapping of WIL scholarship in AI-driven contexts published between 2015 and 2025. The period from 2015 to 2025 was selected as AI-related applications in education and workplace learning began to scale significantly after 2015, accompanied by a marked expansion in both conceptual and empirical research on AI-mediated WIL. The year 2025 was included as the most recent complete year. As one of the first large-scale, data-driven mappings of this emerging domain, the chapter contributes in three key ways. First, it consolidates a fragmented body of literature into a coherent intellectual framework. Second, it identifies dominant and emergent research themes that illuminate how AI is reshaping the purposes, practices, and assumptions of WIL. Third, it offers evidence-based directions for future research, institutional strategy, and policy development to align WIL with increasingly intelligent workplaces. Importantly, the chapter extends beyond descriptive mapping by interpreting bibliometric patterns as epistemic indicators of how WIL is being re-theorised as a socio-technical learning paradigm in response to AI-driven transformations of work. Accordingly, this chapter is organised around the research questions presented in sub-section 1.2.

1.2 Research questions

To address the study's research questions (RQs), a multi-level bibliometric analysis was conducted, encompassing the temporal, geographic, institutional, authorial, source, and conceptual dimensions of the literature, as outlined in Table 1.

Table 1: *RQs, Units of analysis, and analytical strategies*

RQ	Unit of Analysis	Analytical Strategy
RQ1: How has the volume and scholarly influence of publications evolved?	Temporal trends in field development	Longitudinal descriptive and trend-based analysis
RQ2: Which countries demonstrate the highest research output and citation visibility?	National-level scholarly contributions	Comparative country-level assessment
RQ3: Which institutions are the primary contributors to the field?	Institutional research participation	Institutional productivity influence

RQ4: Which authors exert the greatest scholarly influence within the domain?	Individual researcher productivity and impact	Author-level bibliometrics
RQ5: Which scholarly works have exerted the strongest influence on the field's development?	Highly influential publications	Document-level citation analysis
RQ6: Which journals serve as the most influential publication outlets in terms of citation impact?	Source-level visibility and influence	Journal-level citation performance and impact
RQ7: What dominant themes and keyword structures define the field's intellectual landscape?	Conceptual and thematic organisation of the literature	Co-word analysis and thematic evolution

2. Bibliometric Studies on WIL: A Critical Review

To position the present chapter within existing scholarship, Table 2 synthesises key bibliometric contributions in the field, while also revealing the analytical gaps and limitations that remain unaddressed.

Table 2: *Literature review table*

Study	Data Scope & Period	Analytical Emphasis	Key Insights	Key Limitations
Yoo et al., (2025).	932 articles from Web of Science 1994-2023	Intellectual structure, thematic landscape, and emerging trends.	WIL research shows multidisciplinary growth with emphasis on social/contextual learning dimensions.	Analysis confined to peer-reviewed articles up to 2023.
Areskoug Josefsson et al. (2024)	5323 articles from Scopus; 2000-2023	Bibliographic coupling, co-citation, networks	Steady increase in WIL publications; Australia leads output.	Scopus-only; misses synonyms like work-based learning.
Rafiq et al. (2024)	1392 articles from Scopus; 2002-2023	Comprehensive mapping	Exponential post-2015 growth	Limited to select document types after filtering
Ademuyiwa et al. (2024)	222 articles from IJWIL; 2018-2023	Themes, keywords, citations	Equity (18%), skills (15%); qualitative bias	Single journal scope; low generalisability
Amarathunga (2024)	1295 articles from Scopus 2002-2023	Scientometric trends	Australia, South Africa and Canada emerged as the most productive countries within the field of WIL.	Predictive gaps
Amarathunga et al. (2024	521 articles from Scopus 1975-2023	Mapping trends, productivity, citations, geographic contributions, Bradford's Law, Lotka's Law, and keyword thematic analysis	Shows steady growth; top countries are Australia, the USA, and Canada; future pathways include workplace learning.	Limited to Scopus data and specified software tools.

Gessler et al. (2021	5474 articles from Scopus 2011-2020.	Bibliographic coupling, co-citation analysis and co-occurrence analysis.	Scholars from developing countries and nations are excluded from the international discourse	Limited to Scopus.
Bezerra et al. (2021)	Publications from Web of Science	publication trends over time, research areas, contributing countries, and leading organisations	The UK and Australia lead as the main countries; Monash University and Middlesex University are primary knowledge producers.	Limited to WoS, potentially excluding other databases or non-indexed works.
Moosa & Shareefa (2020	100 most-cited articles from Scopus.	Keyword occurrence, co-authorship networks, and bibliometric coupling networks	Research is rising, with two primary schools: learning communities and communities of practice; top journals link closely to education; calls for more Eastern/Asian contributions.	Relies solely on the Scopus database, potentially missing other sources.
Winchester-Seeto & Rowe (2019)	1,542 articles from Web of Science; 1996-2018	Discipline/journal analysis	Education/business/health dominance; practice-oriented	Web of Science underrepresents practitioners

2.3 Gaps in the literature and importance of the chapter

Recent bibliometric studies on WIL reveal several persistent limitations. They often cover narrow temporal windows or periods preceding the advent of AI, emphasise descriptive trends over thematic or relational structures, and underrepresent developing and non-Western contexts (Areskoug Josefsson et al., 2024; Yoo et al., 2025; Gessler et al., 2021; Moosa & Shareefa, 2020). While these studies provide useful snapshots of publication patterns, citations, and contributions from various countries or institutions, they remain predominantly descriptive and do not specifically address AI-mediated transformations of WIL. Consequently, they offer limited insight into the underlying intellectual structures, collaboration networks, or emergent research fronts that define the field. This chapter seeks to address these gaps by (a) extending the temporal window to 2025, (b) employing interpretive thematic analysis to transcend mere description, and (c) explicitly analysing the underrepresentation of scholarship from the Global South. Through the interpretation of bibliometric indicators, this chapter not only maps the field but also provides insights into how WIL is evolving in response to AI-driven transformations of work. This endeavour aims to offer a conceptual lens to guide future research, curriculum design, and policy development.

3. Methodology

This chapter adopts a bibliometric research design, integrating bibliometric and text mining techniques to examine the evolution of WIL scholarship in contexts related to AI. In this study, 'AI-related contexts' refer to research that engages with AI technologies, such as machine learning, generative AI, automation, and intelligent decision-support systems, within WIL environments. This definition informed the search strategy discussed in subsection 3.2, where AI-specific keywords were combined with WIL-related terms, and guided the selection of bibliometric indicators (e.g., keyword co-occurrence and thematic evolution). Although bibliometric methods are inherently quantitative and frequency-based (Börner & Boyack, 2003; Donthu et al., 2021; Kastrin & Hristovski, 2021), the study employs an interpretive analytic framework in which indicators function as proxies for intellectual influence, theoretical alignment, and conceptual change. Co-citation networks are interpreted as shared epistemic foundations, keyword co-occurrence as dominant problem framings, and thematic evolution analysis as shifts in the conceptualisation of WIL in relation to AI over time. This design transcends descriptive reporting to generate inferential insights into the field's developmental trajectory. Text mining encompasses a set of computational techniques used to extract meaningful patterns, trends, and insights from extensive collections of textual data (Chen et al., 2023). Text mining was employed to analyse the publications by identifying recurring keywords, thematic patterns, and conceptual trends, thereby complementing bibliometric techniques such as citation and co-authorship analysis.

3.1 Data source and search strategy

Data were retrieved from the Web of Science (WoS) Core Collection, chosen for its stringent journal selection criteria, stable citation indexing, and widespread usage in high-quality bibliometric research (e.g., Zupic & Čater, 2015; Donthu et al., 2021). While relying on a single database may introduce coverage bias, particularly by excluding regional or practice-oriented outlets, we prioritised WoS to ensure analytical consistency and citation reliability. A structured search strategy was employed, combining terms related to WIL, such as work-integrated, experiential, and work-based learning, with keywords associated with AI, including artificial intelligence, machine learning, and automation. The corpus was limited to peer-reviewed, English-language journal articles published between 2015 and 2025, excluding editorials, reviews, and conference papers. Records were screened in two stages. First, titles and abstracts were reviewed to confirm a clear focus on WIL and AI-related tools or contexts. Second, full texts were assessed when relevance was ambiguous. Studies that mentioned AI only tangentially or addressed workplace learning without a WIL or higher education component were excluded. Following this screening process, 4,975 records were retained (Figure 1).

3.2 Bibliometric tools selection

Multiple bibliometric tools were utilised to examine publication trends, intellectual structures, and thematic development within the field, facilitating methodological triangulation across complementary analytical techniques. Descriptive statistics, performance indicators, and analyses of thematic evolution were conducted using the Bibliometrix R package (version R.5.2) and its web interface, Biblioshiny (Aria & Cuccurullo, 2017; Cobo et al., 2011). VOSviewer (version 1.6.20) (van Eck & Waltman, 2010) was employed to visualise co-authorship networks and co-citation structures, thereby enabling robust identification of collaborative patterns and shared intellectual foundations. The network was standardised using the association-strength measure, and clustering was conducted with a resolution parameter of 1.00. Ten random starts and ten iterative refinements were applied to ensure the robustness and stability of the clustering solution. Microsoft Excel facilitated supplementary data management and trend visualisation. The utilisation of multiple tools enhanced analytical robustness by permitting cross-validation of patterns and minimising tool-specific bias.

3.3 Data analysis techniques

Quantitative bibliometric analyses were conducted using science mapping and text mining to capture both performance indicators and structural relationships within the literature (Figure 1). To establish the field's temporal development, we examined publication growth trends and citation trajectories. Citation impact was assessed using total citations, average citations per document, and h-index metrics, providing complementary measures of scholarly influence. To situate this influence geographically and institutionally, we conducted country- and institution-level analyses of productivity.

3.4 Thematic analysis, ethical considerations and reliability

Building upon the performance-based analyses, the intellectual and conceptual frameworks of the field were scrutinised using network- and content-oriented methodologies. Co-citation and bibliographic coupling analyses were utilised to uncover shared epistemic foundations and coherent research clusters. To ascertain the substantive focus of this body of scholarship, keyword co-occurrence analysis and text mining of titles and abstracts were carried out, facilitating the identification of dominant and emerging themes. Lastly, thematic evolution analysis was employed to trace conceptual shifts over time, emphasising the transition from traditional WIL models to AI-supported mentoring, virtual internships, and digitally mediated workplace learning.

As the study relied exclusively on publicly available secondary bibliographic data, formal ethical clearance was not required. Nonetheless, the study adhered to established ethical research norms, including the responsible utilisation of publicly accessible data and the accurate citation of sources. The reliability of the findings was enhanced through transparent search strategies,

reproducible analytical procedures, and triangulation across multiple bibliometric techniques and software tools

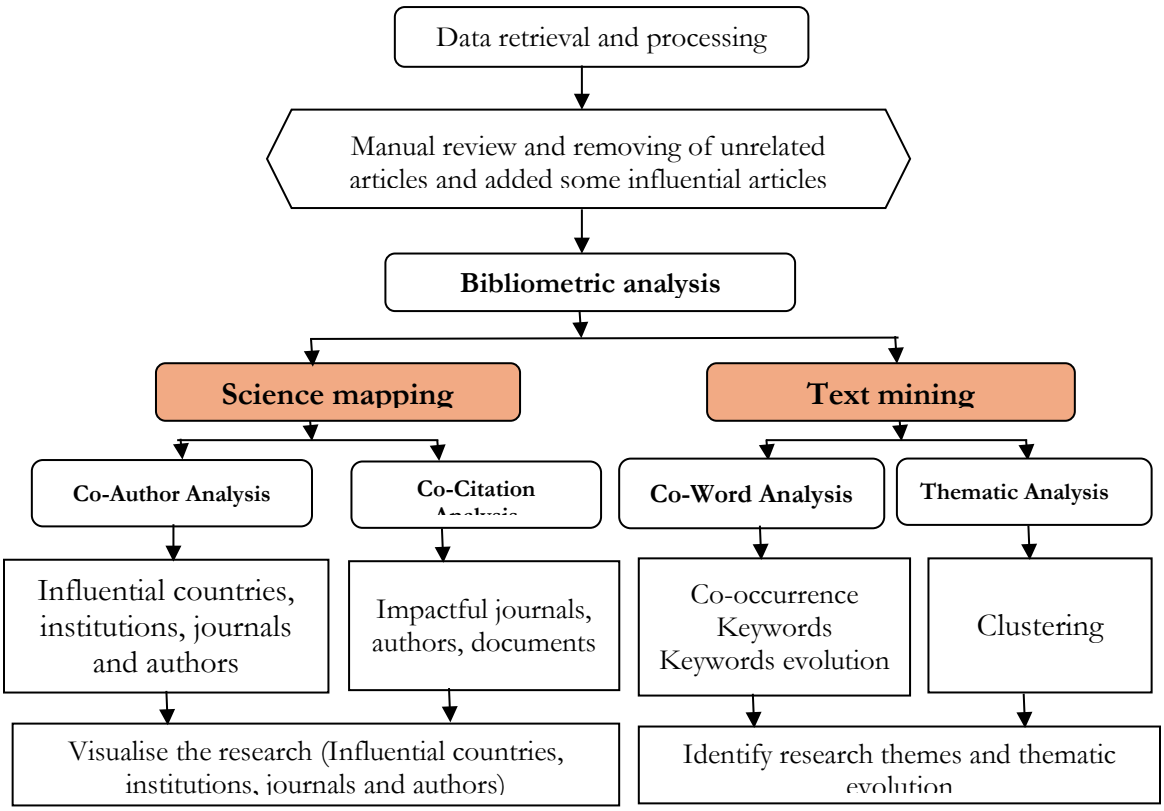

Figure 1: *Methodology flow*

4. Data analysis and interpretations

Table 3 summarises key data extracted from the WoS database between 2015 and 2025.

Table 3: *Key information of WIL scholarship*

Description	Results
Main information about the data	
Timespan	2015:2025
Sources (Journals)	529
Documents	4995
Annual Growth Rate %	-12.51
Document Average Age	3.13
Average citations per doc	10.84
Document contents	
Author's Keywords (DE)	13628
Authors	
Authors	14499

Authors of single-authored docs	714
Authors collaboration	
Single-authored docs	772
Co-Authors per Doc	3.36
International co-authorships %	19.94
Document types	
Article	4975

4.1 Acceleration and consolidation of WIL scholarship in AI-driven contexts

Year-on-year (YoY) growth in publications and citations was analysed to map the field's non-linear evolution. The formative phase (2015-2019) showed volatile publication growth alongside rapid citation expansion, providing evidence of early knowledge consolidation. A 234.9% surge in publications in 2020 marked a structural inflexion, shifting the field from exploration to large-scale expansion amid widespread AI adoption. The convergence of publication and citation growth rates after 2021 may suggest increasing consensus around methodological approaches, although this inference requires further qualitative validation. The recent phase (2024-2025) displays exponential growth in both metrics, reflecting mainstreaming and algorithmically amplified visibility. For WIL, this signals a shift from descriptive employability models towards AI-mediated, data-informed, and skills-adaptive frameworks. Impact now seems to depend on integrating learning analytics, automation, and workplace intelligence to align curricula with fast-changing labour market needs.

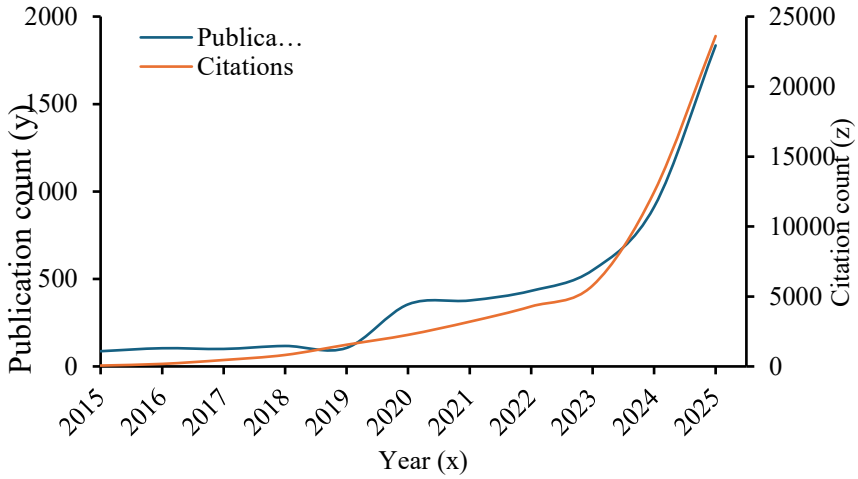

Figure 2: *Intellectual maturation through publication and citation dynamics*

4.1.1 Publications and citations growth

The annual number of publications grew from 87 in 2015 to a peak of 1,835 in 2025, with an average of 414.58 publications per year. As presented in Table 3, this represents a consistent upward trajectory over the study period. The year-on-year percentage growth rates for both publications and citations were calculated using the following formula:

(Current-Previous)/Previous × 100)

The YoY growth rate measures how much the number of publications has increased or decreased compared to the previous year, expressed as a percentage. This growth rate is determined by calculating the percentage change in publication output from one year to the next, thereby capturing increases or declines in research productivity over time.

Table 4: *YoY Growth of publications*

Year	Publication count	Publication Growth (%)	Citation count	Citation Growth (%)
2015	87	–	62	–
2016	104	19.54	181	191.94
2017	100	−3.85	459	153.59
2018	117	17.00	819	78.43
2019	106	−9.40	1550	89.26
2020	355	234.91	2257	45.61
2021	377	6.20	3194	41.52
2022	432	14.59	4286	34.18
2023	550	27.31	5779	34.83
2024	912	65.82	12465	115.69
2025	1835	101.21	23609	89.43

4.2 Global patterns of productivity and scholarly influence in WIL

Among these, the United States, China, and Australia emerged as the most prolific contributors (see Table 6). The resulting geographic concentration is visually underscored in Figure 3, which illustrates that global scholarship is predominantly characterised by research outputs from the United States, China, and Australia. This phenomenon underscores how WIL knowledge production remains entrenched within a limited number of highly resourced higher education systems. Such unipolarity raises significant questions regarding whose contexts, labour markets, and pedagogical models are influencing the global WIL discourse.

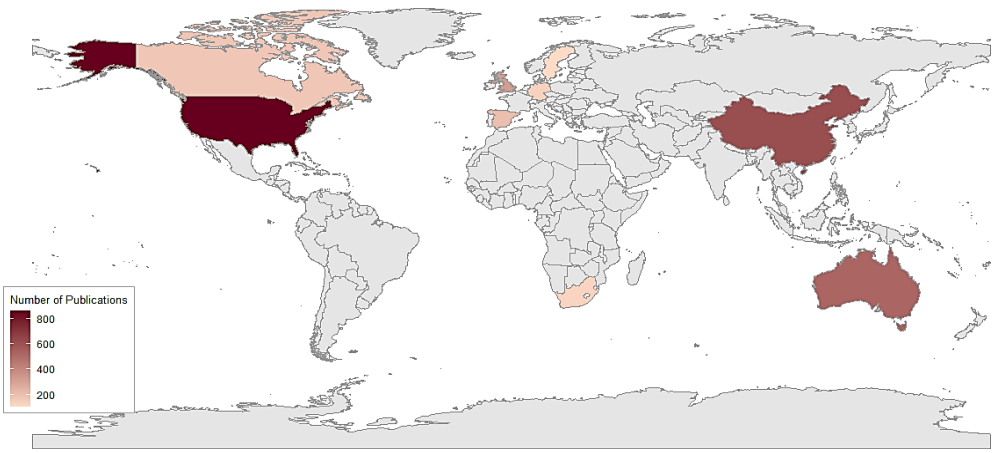

Figure 3: *Geographies of knowledge production in the field*

To isolate significant contributors and ensure analytical robustness, we applied a strict inclusion criterion with a dual threshold of a minimum of 10 documents and 100 citations for a country to be included in the final analysis. This criterion reduced the dataset from 125 countries to 60 eligible nations. The bibliometric network analysis (Figure 4) reveals a distinct geopolitical concentration in WIL-AI research. The visualisation identifies three dominant clusters: a North America-Oceania hub (USA, Canada, Australia, New Zealand), a European Union bloc, and an East Asia-Pacific group led by China. This tripartite structure suggests that a substantial portion of the foundational knowledge, tools, and models for AI in WIL is currently generated in high-resource, technologically advanced economies. The pronounced underrepresentation of most Global South nations underscores a critical research-capacity gap. Within the field, this geographic imbalance raises the risk that emerging AI-WIL frameworks may be contextually narrow, potentially misaligned with the socioeconomic realities and labour markets of underrepresented regions, and may inadvertently perpetuate rather than mitigate global skills inequalities.

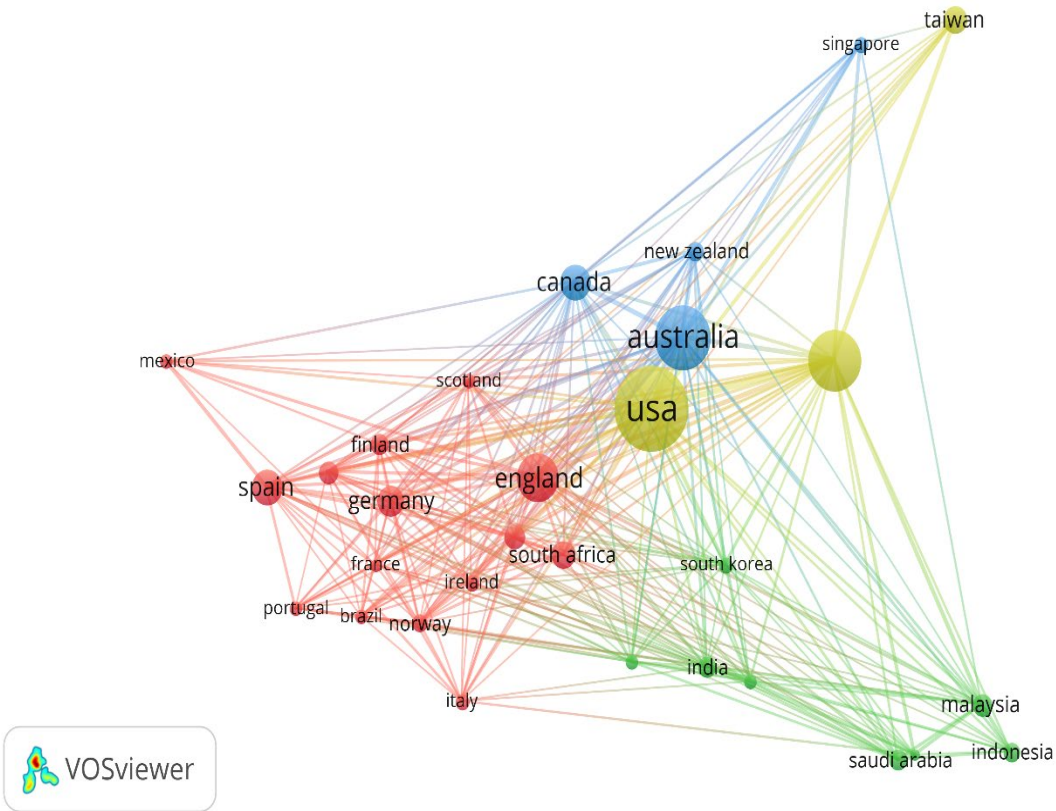

Figure 4: *Countries' productivity impact*

Table 5. *National and regional leadership in WIL knowledge production (Top 20)*

		2015-2025							2015-2017		2018-2019		2020-2021		2022-2023		2024-2025	
No	Country	TP	TP %	TC	C/P	SCP	MCP	MCP %	TP	TC	TP	TC	TP	TC	TP	TC	TP	TC
1	USA	860	17.2	8648	10.10	777	83	9.7	81	2586	85	1852	186	2376	200	2079	442	1561
2	China	614	12.3	8201	13.40	487	127	20.7	11	342	13	261	33	906	89	3889	422	1969
3	Australia	528	10.6	7847	14.90	422	106	20.1	53	2191	47	1647	145	2105	141	1679	224	950
4	United Kingdom	315	6.3	5127	16.30	242	73	23.2	28	1266	37	1434	72	1028	78	2333	164	1000
5	Spain	199	4	2126	10.70	166	33	16.6	15	618	14	941	31	696	62	502	117	391
6	Canada	171	3.4	1188	6.90	155	16	9.4	14	423	13	228	60	698	46	218	102	304
7	Germany	138	2.8	1585	11.50	102	36	26.1	9	387	-	-	29	469	35	587	94	403
8	South Africa	127	2.5	821	6.50	109	18	14.2	9	116	-	-	29	234	42	438	70	186
9	Sweden	102	2	1120	11.00	88	14	13.7	6	156	-	-	19	380	33	355	61	221
10	India	80	1.6	761	9.50	69	11	13.8	-	-	-	-	6	376	13	190	79	544
11	Netherlands	76	1.5	1726	22.70	55	21	27.6	22	610	-	-	29	543	18	828	42	199
12	Malaysia	74	1.5	545	7.40	45	29	39.2	-	-	-	-	-	-	11	122	78	363
13	Finland	71	1.4	1044	14.70	52	19	26.8	7	348	10	1434	13	167	18	358	47	281
14	Indonesia	70	1.4	165	2.40	55	15	21.4	-	-	-	-	-	-	-	-	70	165
15	New Zealand	65	1.3	850	13.10	47	18	27.7	7	435	-	-	28	355	17	163	36	278
16	Norway	60	1.2	480	8.00	40	20	33.3	-	-	-	-	20	223	-	-	-	-
17	Saudi Arabia	60	1.2	508	8.50	48	12	20	-	-	-	-	7	100	7	116	76	472
18	Israel	54	1.1	436	8.10	51	3	5.6	-	-	-	-	-	-	-	-	-	-
19	Ireland	50	1	309	6.20	36	14	28	-	-	-	-	11	103	-	-	-	-
20	Thailand	48	1	255	4.70	40	8	16.7	-	-	-	-	-	-	12	102	-	-

Abbreviations: R: rank; TP: total publications; TP%: percentage of publications; TC: total citations; C/P: citations per publication; SCP: Single-Country Publications, 'domestic' papers with no international collaboration; MCP: Multiple-Country Publications, the number of publications produced through international cooperation; MCP%: Multiple-Country Publications Percentage.

4.3 Institutional concentration and its implications for field development

The institutional analysis refined the dataset from 4,059 institutions to 69 significant contributors that met the threshold of 15 documents and 100 citations (the top 20 in Table 7). The threshold of at least 15 documents and 100 citations was applied to focus the analysis on institutions with sustained productivity and meaningful impact, thereby enhancing the robustness and interpretability of the results. The dominance of Australian institutions in the top tier of WIL research, as evidenced by four leading positions (Table 7), can be attributed to a confluence of national policy, systemic investment, and academic-cultural prioritisation. Australia has enacted a sustained, nationwide strategy that integrates WIL as a core component of higher education policy and funding frameworks (Jackson & Cook, 2025). This approach is supported by cohesive university-industry partnerships and dedicated research centres that regard WIL not as an ancillary activity but as a primary scholarly domain. The prominence of Australian institutions suggests that WIL research may be influenced by deliberate and coordinated national efforts. The integration of WIL into higher education policy and funding frameworks appears to incentivise and support universities in embedding WIL within curricula and advancing related research. Consequently, Australian institutions are better positioned to produce sustained, high-quality, and well-funded WIL scholarship, which can enhance their visibility and citation impact. More broadly, this pattern indicates the potential for systemic policy alignment and strategic investment to shape not only educational practice but also the global research landscape within the field.

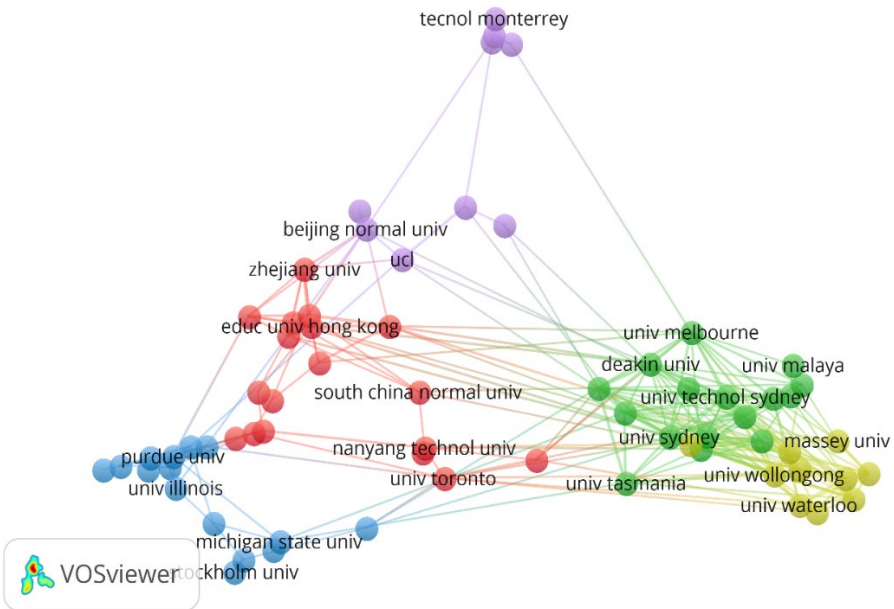

***Figure 5**: Institution productivity visualisation*

The institutional network (Figure 5) reveals a specialised leadership structure. Dominance is held by applied educational technology institutions, such as the Tecnológico de Monterrey (Mexico),

a Chinese cohort led by Beijing Normal and Zhejiang Universities, and a dense cluster in Australia. Traditional U.S. and European education research centres are minimally represented. This indicates that the field is shaped by regionally concentrated, practice-driven innovation, which risks creating fragmented theoretical foundations and a growing divide between technological application and core pedagogical research.

Table 6: *Centres of Excellence and Knowledge Leadership in WIL Research (Top 20)*

R	Institution	Country	TP	TC	C/P	ARWU	QS
1	University of Wollongong	Australia	56	650	11,61	301-400	184
2	Deakin University	Australia	55	1193	21,69	201-300	207
3	Edith Cowan University	Australia	50	1716	34,32	801-900	487
4	University of Sydney	Australia	50	700	14,00	72	20
5	Education University of Hong Kong	Hong Kong	46	441	9,59	801-900	-
6	Monash University	Australia	46	969	21,07	76	36
7	University of Hong Kong	Hong Kong	43	1946	45,26	67	11
8	Griffith University	Australia	40	779	19,48	301-400	268
9	University of Melbourne	Australia	40	302	7,55	38	19
10	University of Waterloo	Canada	40	351	8,78	151-200	119
11	Chinese University of Hong Kong	Hong Kong	37	1286	34,76	101-250	32
12	University of Queensland	Australia	36	427	11,86	65	42
13	Tecnológico de Monterrey	Mexico	35	608	17,37	-	187
14	University of Technology Sydney	Australia	35	1068	30,51	201-300	96
15	University of Toronto	Canada	35	389	11,11	25	29
16	Beijing Normal University	China	34	301	8,85	101-150	247
17	Curtin University	Australia	33	345	10,45	201-300	183
18	Purdue University	USA	32	469	14,66	101-150	88

19	RMIT University	Australia	32	235	7,34	301-400	125
20	Nanyang Technological University	Singapore	30	389	12,97	88	12

The 2025 Academic Ranking of World Universities https://www.shanghairanking.com/rankings/arwu/2025; QS: World University Rankings 2026 https://www.qschina.cn/en/university-rankings/world-university-rankings/2026

4.4 Journals defining scholarly conversation and trajectory

Out of 579 journals, 77 met the threshold of at least 10 publications and 100 citations per journal, representing a balance of productivity and scholarly influence. Table 8 presents the top 20 ranked journals based on publication output and citation impact. Prominent journals (Figure 6), such as Education and Information Technologies, Education Sciences, International Journal of Work-Integrated Learning, Frontiers in Education, and Higher Education Skills and Work-Based Learning, exhibit widespread readership and robust citation networks. Scholars publishing in these journals not only enhance their visibility but also amplify their potential for impact, collaboration, and engagement in ongoing dialogues within the realms of education and WIL research. These journals are considered benchmarks for both academic rigour and strategic publication strategies.

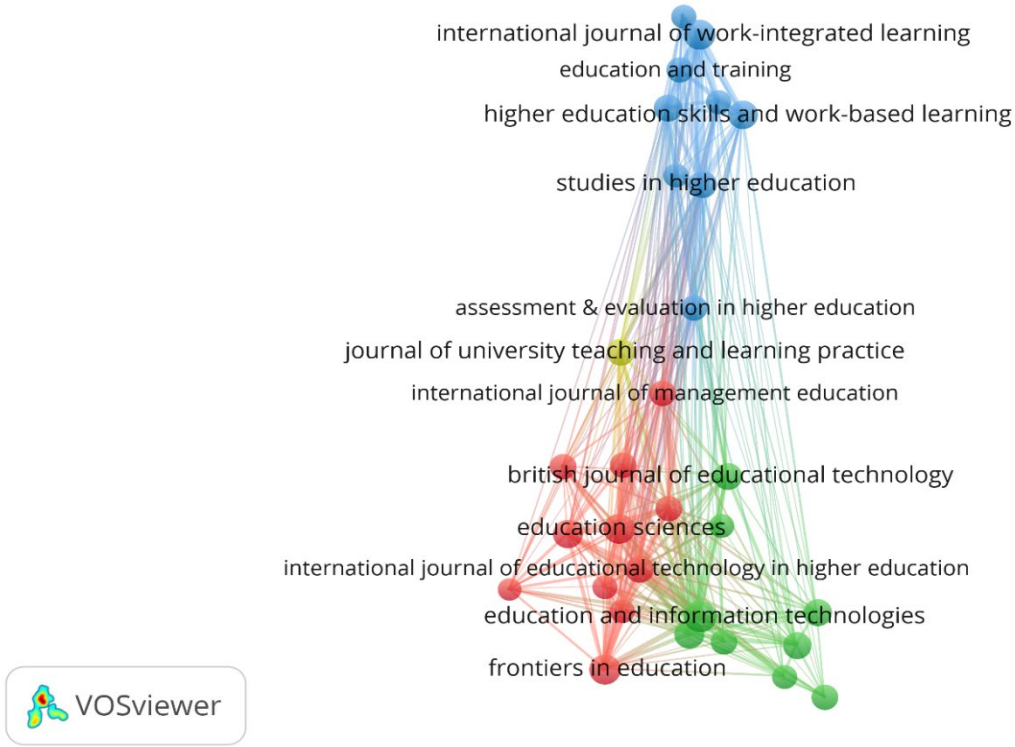

Figure 6: *Journal citation network visualisation*

Table 7: *Elite Journals and the Circulation of High-Impact WIL Research (Top 20)*

	Source	TP	TC	C/P	H index	G index	M index	IF (Q) 2024	5-Year IF
1	Education and Information Technologies	232	3491	15.05	31	50	3.44	5.4 (1)	5.7
2	Education Sciences	216	1849	8.56	20	36	2.86	2.6 (1)	2.7
3	International Journal of Work-Integrated Learning	195	992	5.09	14	21	2.00	1.5 (2)	2.1
4	Frontiers In Education	158	647	4.09	14	20	2.00	1.9 (2)	2.4
5	Higher Education Skills and Work-Based Learning	105	455	4.33	10	16	1.43	1.8 (2)	2.1
6	Cogent Education	95	464	4.88	11	20	2.20	2.0 (2)	2.1
7	Interactive Learning Environments	90	2135	23.72	20	45	1.67	5.3 (1)	6.2
8	British Journal of Educational Technology	65	1173	18.05	19	32	1.58	8.1 (1)	8.1
9	Studies In Higher Education	58	1830	31.55	22	42	1.83	3.2 (1)	4.7
10	Higher Education Research & Development	57	649	11.39	14	23	1.17	2.9 (1)	3.7
11	Journal of University Teaching and Learning Practice	57	1094	19.19	12	32	1.71	4.4 (1)	3.1
12	Social Work Education	57	270	4.74	9	14	1.29	1.1 (1)	1.6
13	Computers & Education	56	2576	46.00	28	50	2.33	10.5 (1)	13
14	International Journal of Educational Technology in Higher Education	50	3130	62.60	22	50	2.00	16.7 (1)	15.5
15	Journal of Computer Assisted Learning	48	514	10.71	13	21	1.08	4.6 (1)	5.9
16	European Journal of Education	47	316	6.72	9	17	0.82	3.6 (1)	4.0
17	Ieee Transactions on	46	414	9.00	11	19	1.10	4.9 (1)	5.5

	Learning Technologies								
18	International Journal of Management Education	41	918	22.39	14	30	1.56	7.4 (1)	7.2
19	Educational Technology Research and Development	41	548	13.37	13	23	1.08	4.2 (1)	5.3
20	Journal of Social Work Education	40	322	8.05	11	16	0.92	1.2 (2)	1.5

Abbreviations in Table 7, H-index: A journal has an h-index of h if they have h publications each cited at least h times; G-index: A journal has a g-index of g if their top g publications together have at least g^2 citations; M-index: Normalises the h-index by career length. IF (Q) 2025 = 2025 Impact Factor, with quartile ranking (Q1–Q4) in the subject category; 5-Year IF = 5-Year Impact Factor, averaging citations over the previous five years.

4.5 Pillars of knowledge production

Of the 14,499 authors, 59 fulfilled the criteria of having a minimum of five publications and 20 citations, with 21 forming discernible collaborative networks (Figure 7). In accordance with bibliometric conventions for recognising prolific contributors, authors were assessed based on their productivity, citation counts, and h-index (Table 11). Leading scholars, including Jackson, D., Boud, D., and Chai Ching, S., are distinguished by the significant influence of their work across multiple subfields. Their research has shaped key debates and garnered extensive citations, thereby consolidating their central role within the scholarly community. For emerging researchers, engaging with the work of these authors or collaborating within their networks presents strategic opportunities to enhance visibility and increase impact.

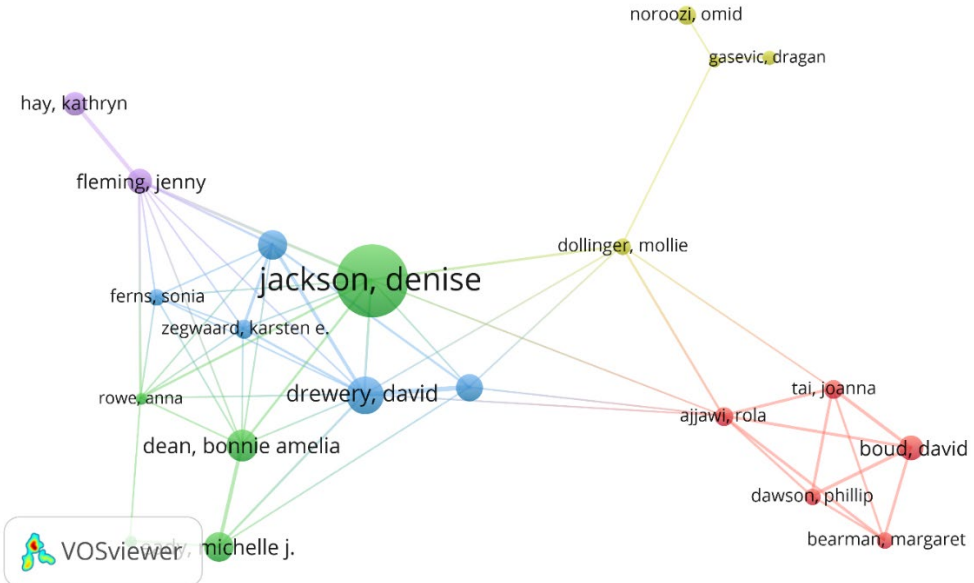

Figure 7: *Network visualisation of authors*

Table 8: Elite authorship of WIL scholarship (Top 20)

R	Author(s)	Profile/author page (direct link)	H Index	G index	M Index	TP	TC	PY start
1	Jackson, D	https://scholar.google.com/citations?hl=en&user=24GmN7IAAAAJ&utm_	19	35	1.58	35	1690	2015
2	Boud, D	https://scholar.google.com/citations?hl=en&user=nwO_6ukAAAAJ&utm_	8	11	0.89	11	697	2018
3	Chai C, S	https://scholar.google.com/citations?user=UFPLt7AAAAAJ&hl=en&oi=ao	8	10	0.80	10	737	2017
4	Pretti, J	https://scholar.google.com/citations?user=65ANDDwAAAAJ&hl=en&oi=ao	8	13	1.00	13	192	2019
5	Chiu, T	https://scholar.google.com/citations?user=waxoip4AAAAJ&hl=en&oi=ao	7	13	1.40	13	968	2022
6	Hwang, GJ	https://scholar.google.com/citations?user=H0wG-t4AAAAJ&hl=en&oi=ao	7	16	0.64	19	284	2016
7	Roberts, C	https://scholar.google.com/citations?user=KWVND8YAAAAJ&hl=en&oi	7	8	0.64	8	278	2016
8	Bozkurt, A	https://scholar.google.com/citations?user=8HKKXGUAAAAJ&hl=en&oi=ao	6	8	1.20	8	143	2022
9	Chan C, KY	https://scholar.google.com/citations?user=0wkKzzgAAAAJ&hl=en&oi=ao	6	7	1.50	7	1526	2023
10	Dean, B	https://scholar.google.com/citations?user=V8epkZwAAAAJ&hl=en&oi=ao	6	13	0.86	14	172	2020
11	Fleming, J	https://scholar.google.com/citations?user=VI-7H-oAAAAJ&hl=en&oi=ao	6	11	0.75	11	146	2019
12	Strzelecki, A	https://scholar.google.com/citations?user=_YLW4XwAAAAJ&hl=en&oi=ao	6	9	2.00	9	738	2024
13	Tai, J	https://scholar.google.com/citations?user=ilfMvcsAAAAJ&hl=en&oi=ao	6	8	0.67	8	638	2018
14	Ajjawi, R	https://scholar.google.com/citations?user=uFaXeLYAAAAJ&hl=en&oi=ao	5	8	0.56	8	703	2018
15	Cukurova, M	https://scholar.google.com/citations?user=OsfFt0cAAAAJ&hl=en&oi=ao	5	6	1.25	6	76	2023
16	Dawson, P	https://scholar.google.com/citations?user=0LcJrnsAAAAJ&hl=en&oi=ao	5	7	0.56	7	517	2018
17	Eady, M	https://scholar.google.com/citations?user=QDOHSj4AAAAJ&hl=en&oi=ao	5	6	0.71	13	55	2020
18	Hay, K	https://scholar.google.com/citations?user=EJJPP7IAAAAJ&hl=en&oi=ao	5	8	0.71	10	72	2020
19	Kim, J	https://scholar.google.com/citations?user=9SuiJiwAAAAJ&hl=en&oi=ao	5	6	1.67	6	131	2024
20	Morphet, J	https://scholar.google.com/citations?user=pGy3brkAAAAJ&hl=en&oi=ao	5	5	0.71	5	94	2020

Abbreviations in Table 1, except PY Start (Publication Year Start): The year a given document was published.

4.5 Seminal works setting the research agenda

We examined WIL publications that met a threshold of at least 100 citations per article to capture the field's most highly cited contributions as a proxy for influence. Out of 4,995 documents, 70 met this criterion, highlighting a select set of highly impactful studies. The citation network (Figure 8) and the top 20 cited works (Table 12) underscore the impact of authors such as Cotton, Dre (2024), Chan, Cky (2023), and Farrokhnia, M (2024), whose research has shaped WIL scholarship. For scholars, these works represent critical reference points and offer both a roadmap for high-impact research and potential avenues for collaboration or further investigation in the field.

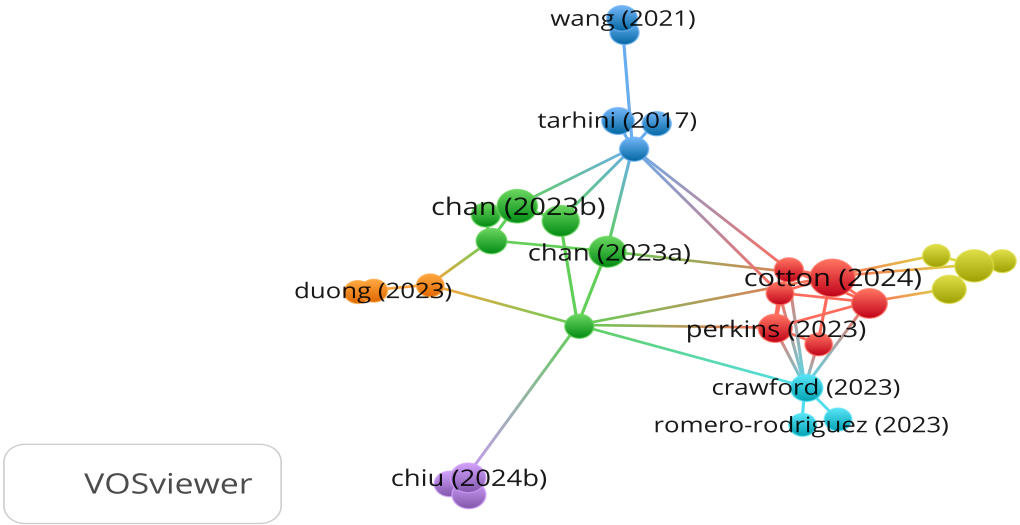

Figure 8: *Document citation network analysis*

Table 1: *High-impact publications structuring the WIL knowledge base (Top 20)*

R	Paper	DOI	TC	C/Y	Normalised TC
1	Cotton Dre, 2024	https://doi.org/10.1080/14703297.2023.2190148	1181	393.67	97.43
2	Chan Cky, 2023	https://doi.org/10.1186/s41239-023-00411-8	718	179.50	45.89
3	Farrokhnia M, 2024	https://doi.org/10.1080/14703297.2023.2195846	582	194.00	48.01
4	Crompton H, 2023	https://doi.org/10.1186/s41239-023-00392-8	482	120.50	30.80
5	Chan Cky, 2023	https://doi.org/10.1186/s41239-023-00408-3	466	116.50	29.78
6	Jackson D, 2015	https://doi.org/10.1080/03075079.2013.842221	452	37.67	14.58
7	Tai J, 2018	https://doi.org/10.1007/s10734-017-0220-3	419	46.56	15.26
8	Strzelecki A, 2024	https://doi.org/10.1080/10494820.2023.2209881	366	122.00	30.19
9	Greenhow C, 2016	https://doi.org/10.1080/17439884.2015.1064954	358	32.55	11.10
10	Chiu Tkf, 2024	https://doi.org/10.1080/10494820.2023.2253861	348	116.00	28.71
11	Perkins M, 2023	https://doi.org/10.53761/1.20.02.07	313	78.25	20.00
12	Chatterjee S, 2020	https://doi.org/10.1007/s10639-020-10159-7	303	43.29	17.20

13	Michel-Villarreal R, 2023	https://doi.org/10.3390/educsci13090856	299	74.75	19.11
14	Chiu Tkf, 2024	https://doi.org/10.1080/10494820.2023.2172044	276	92.00	22.77
15	Manca S, 2016	https://doi.org/10.1016/j.compedu.2016.01.012	276	25.09	8.56
16	Tarhini A, 2017	https://doi.org/10.1080/10494820.2015.1122635	249	24.90	7.50
17	Mohammadyari S, 2015	https://doi.org/10.1016/j.compedu.2014.10.025	249	20.75	8.03
18	Crawford J, 2023	https://doi.org/10.53761/1.20.3.02	244	61.00	15.59
19	Xia Q, 2022	https://doi.org/10.1016/j.compedu.2022.104582	211	42.20	19.45
20	Jackson D, 2017	https://doi.org/10.1007/s10734-016-0080-2	193	19.30	5.81

4.6 Core topics and emerging research themes

4.6.1 Keywords analysis

Keywords in an article serve as the conceptual anchors of the research, and their frequency and co-occurrence not only illuminate dominant topics but also reflect the intellectual priorities that shape the field (Radhakrishnan et al., 2017). Among the 13,628 keywords extracted from the dataset, only 84 met the minimum threshold of 50 occurrences, indicating a highly consolidated thematic structure. As illustrated in Figure 9, the research is firmly centred on artificial intelligence, education, and higher education, with an increasing prominence of terms such as "students," "ChatGPT," "generative AI," "technology," and "employability." This pattern signifies a shift from traditional Work Integrated Learning (WIL) conceptualisations towards an emerging focus grounded in artificial intelligence.

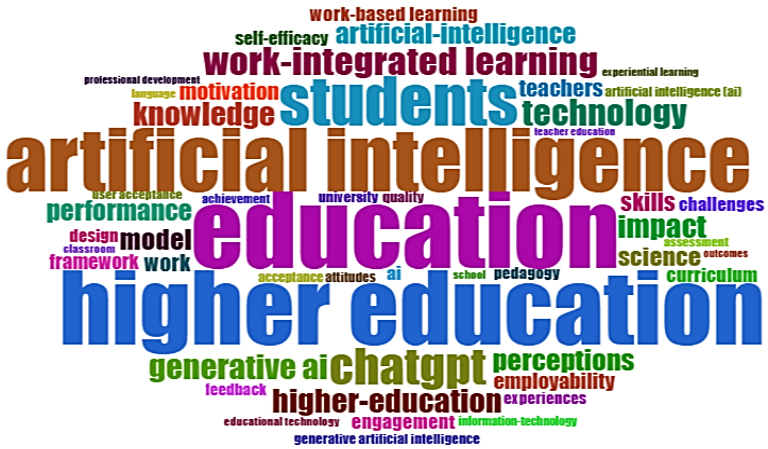

Figure 8: Frequency word cloud

4.6.2 What Are the current and future WIL thematic directions?

Triangulating the keyword co-occurrence overlay network (Figure 10) with the thematic evolution map (Figure 11) provides convergent evidence of a substantial reorientation of WIL scholarship towards AI-mediated forms of WIL. The dense green cluster (Figure 10), anchored in education, skills, performance, and employability, reflects the field's traditional concern with learning outcomes and graduate readiness. In contrast, the emergent yellow cluster, centred on artificial intelligence, generative AI, and ChatGPT, signals a rapid shift towards technologically mediated forms of WIL. Crucially, the strong connective ties between these clusters, via constructs such as self-efficacy, technology, feedback, and user acceptance, suggest that employability is increasingly produced through sociomaterial assemblages in which human capability and intelligent systems are co-constitutive.

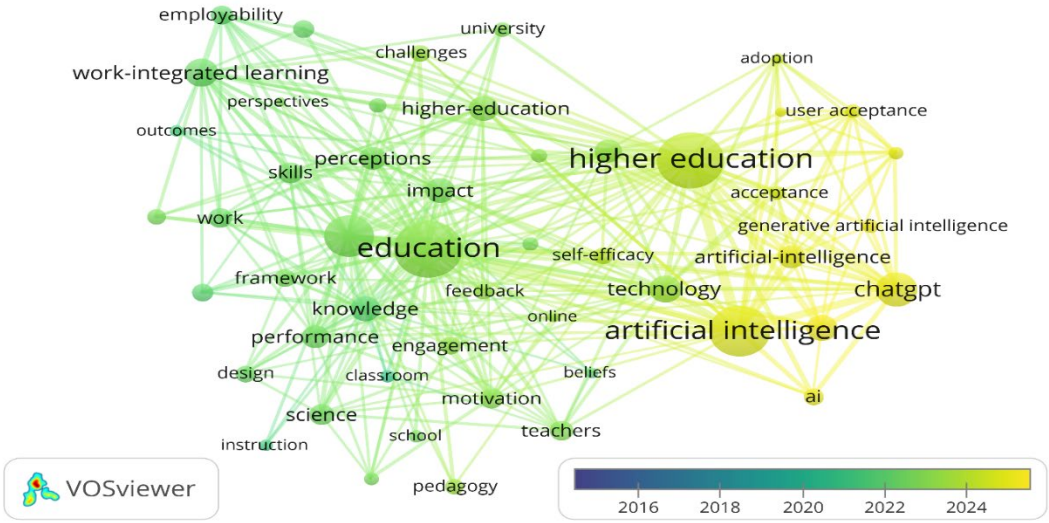

Figure 9: *Keyword co-occurrence overlay network*

The thematic evolution analysis (Figure 11) indicates a clear longitudinal shift in WIL scholarship. Between 2015 and 2018, research focused on foundational educational concerns, including work-based learning, students, teachers, and knowledge. During 2019-2020, WIL emerged as a consolidated construct, accompanied by themes of reflection, collaboration, and pedagogical models, signalling an increasing conceptual formalisation. In 2021-2022, attention shifted toward outcome-oriented themes such as impact, while maintaining continuity around education and students. From 2023 onwards, the literature exhibits a marked inflection towards technology-mediated learning, with the emergence of motivation, self-regulated learning, and generative learning. Although the study period spans 2015-2025, thematic evolution beyond 2025 is expected to be increasingly shaped by AI-related themes. In particular, higher-order competencies such as critical thinking and strategic behaviour are likely to become more prominent, suggesting a reorientation of WIL towards AI-mediated environments.

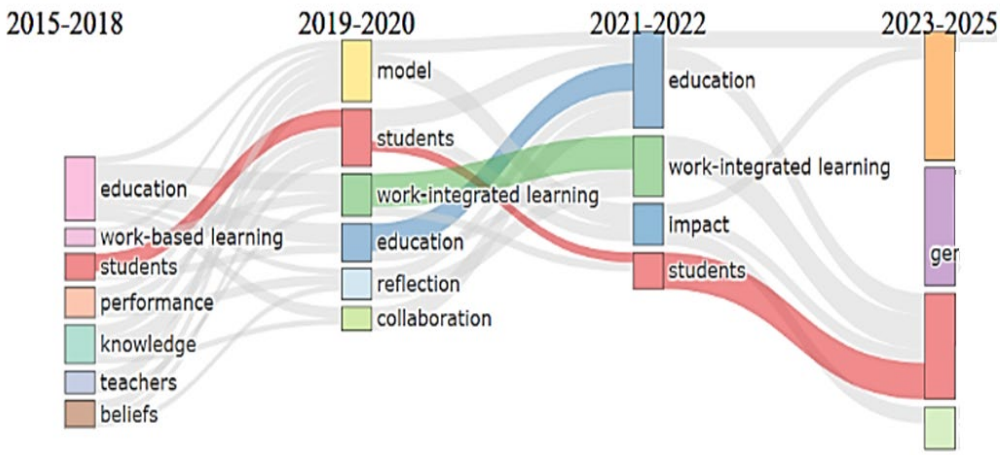

Figure 10: Thematic evolution analysis

5. Discussion

This chapter presents a comprehensive bibliometric analysis of WIL scholarship in the AI-driven era from 2015 to 2025. By integrating quantitative bibliometrics with interpretive thematic evolution tracking, this chapter transcends the descriptive trends that characterise much of the existing review literature. The findings reveal not only the accelerating volume and shifting geography of research but, more importantly, the profound intellectual reconfiguration of WIL as it responds to the pressures and possibilities of AI. This discussion contextualises these findings within the existing body of bibliometric reviews on WIL, highlighting points of convergence and contradiction, and, most critically, the novel contributions this analysis makes to understanding a field in transition.

5.1 Accelerated and inflected growth: Confirming and extending trajectories

Prior bibliometric studies of WIL have consistently documented steady growth, attributing it to the global emphasis on graduate employability and experiential education. For instance, Rafiq et al. (2024) noted rapid growth post-2015, while Amarathunga et al. (2024) and Bezerra et al. (2021) mapped a consistent upward trajectory in publication output. This chapter confirms that overarching trend but introduces a crucial nuance. This nuance is the identification of a structural inflexion point around 2020, characterised by a 234.9% year-on-year surge in publications. This discontinuity, not explicitly highlighted in earlier reviews, aligns with the catalytic convergence of the COVID-19 pandemic's impetus towards digitalisation and the maturation of accessible artificial intelligence tools, such as advanced learning analytics and generative AI. This suggests that, in contrast to the more linear narratives of past studies, AI has functioned less as an incremental topic of interest and more as a disruptive catalyst, compressing and accelerating the field's development. Furthermore, while Gessler et al. (2021) analysed trends up to 2020 and noted a growing interest, our extended timeline to 2025 captures the

subsequent phase of 'rapid growth,' indicating the field's swift transition from an emerging niche to a mainstream, interdisciplinary research frontier.

5.2 Geographies of knowledge production: persistent imbalances and polycentricity

The geographic distribution of WIL research has been a consistent focus of prior bibliometric analyses, with a clear consensus regarding the predominance of Anglophone and Western European nations. Areskoug Josefsson et al. (2024), Winchester-Seeto and Rowe (2019), and Bezerra et al. (2021) all identified Australia, the UK, the USA, and Canada as the most prolific contributors. Our findings corroborate the sustained productivity of these nations, particularly highlighting Australia's notable institutional dominance. However, this study adds a significant dimension to this understanding by documenting the dramatic increase in East Asian scholarship, led by China, which now ranks second in both output and citation impact. This shift begins to address the calls made by Moosa & Shareefa (2020) for greater contributions from Eastern and Asian contexts, although our network analysis reveals that these contributions often form a distinct cluster. Crucially, this emerging polycentricity coexists with a persistent and pronounced underrepresentation of the Global South. This observation reinforces the critical limitations noted by Gessler et al. (2021), who cautioned that scholars from developing countries are frequently excluded from the international discourse. Our analysis extends this critique into the era of artificial intelligence and suggests the potential for a dangerous feedback loop. We caution that AI-WIL models are predominantly designed in and for high-resource, technologically intensive environments, potentially widening rather than bridging global inequities in skills development. This geographic imbalance moves beyond the descriptive 'who publishes' reported in earlier studies to highlight a fundamental contextual misalignment in the field's foundational knowledge, presenting a novel and critical implication for future research and policy.

5.3 Thematic evolution

Thematic analysis has been a component of previous reviews; however, such analyses have often remained at a high level or within a narrow scope. Ademuyiwa et al. (2024), for instance, identified equity and skills as predominant themes within a single journal, while Yoo et al. (2025) employed topic modelling to trace broad multidisciplinary growth. The longitudinal co-word and thematic evolution analysis offers a granular and dynamic perspective. It substantiates the foundational themes of 'employability,' 'reflection,' and 'pedagogical models,' which have been consistently reported in the literature, and maps their evolution over time. A key innovation in this analysis is the clear visualisation of a thematic pivot occurring post-2020, leading to the predominance of AI-centric terms such as 'generative AI,' 'ChatGPT,' and 'virtual internship' by 2025. Earlier reviews, even those published recently that relied on data concluding in 2023, were unable to fully capture this rapid reorientation. This shift signifies more than merely the introduction of new keywords; it represents an epistemic evolution in the conceptualisation of

WIL. The field is transitioning from a socio-cultural model—emphasising community, mentorship, and situated practice—towards a socio-technical paradigm where intelligent systems and data mediate learning. This development directly engages with the emerging scholarly inquiry noted in the introduction, concerning virtual internships, intelligent tutoring, and simulation-based training, and provides substantial bibliometric evidence that these are not marginal interests but rather central, defining trends.

5.4 Fragmentation, convergence, and a new interdisciplinary core

A recurring critique in the WIL narrative literature, and, indirectly, in bibliometric reviews, is the field's conceptual fragmentation across disciplinary silos. Our co-citation and bibliographic coupling analyses provide an empirical map of this structure. While fragmentation persists, we also identify the formation of a convergent interdisciplinary core. Influential scholars are no longer solely veteran WIL theorists (e.g., Jackson, Boud, Zegwaard). The field now actively incorporates leading voices from educational technology and artificial intelligence in education (e.g., Hwang, G.-J.; Chiu, T.K.F.). This fusion represents a pivotal development. Unlike the discipline-bound analyses lamented in the introduction, this convergence suggests the emergence of a transdisciplinary dialogue that is essential for addressing the complex challenges of AI-mediated WIL. Furthermore, our analysis of seminal works reveals that recent, high-impact studies are disproportionately focused on AI applications (e.g., Cotton, 2024; Chan, 2023; Farrokhnia, 2024). This indicates that technological innovation is increasingly shaping the research agenda, a dynamic not evident in earlier bibliometric snapshots that highlighted foundational WIL theory papers. This has implications for the field's theoretical development, potentially privileging applied, technology-focused studies over critical, philosophical, or socio-cultural explorations of work and learning.

6. Conclusions and Forward-Looking Implications

This chapter makes several distinct contributions that address gaps explicitly identified in prior reviews. First, it provides a large-scale, dedicated analysis of WIL in the AI-driven era, addressing the lack of coherent synthesis noted in the introduction. Second, it employs a methodologically triangulated approach, combining performance analysis, network science, and thematic evolution, which moves beyond the descriptive trends observed in studies such as Amarathunga (2024) and Rafiq et al. (2024) to reveal relational and intellectual structures. Third, it interprets bibliometric patterns as epistemic indicators, arguing that the data reflect a paradigm shift in the conception of WIL itself. The implications are substantial. For researchers, the findings necessitate a deliberate engagement with both learning science and AI ethics, moving beyond isolated case studies to develop robust theories for hybrid human-AI WIL. For institutions, the accelerated growth and thematic shift underline an urgent need to invest in digital WIL infrastructure, educator training in AI tools, and ethical frameworks for algorithmic assessment. For policymakers, the geographic imbalances necessitate targeted funding to support

contextually relevant AI-WIL research in underrepresented regions, ensuring that the future of work-integrated learning does not become another vector of global inequality. Institutions should invest in teacher training programmes that focus on the pedagogical integration of AI tools in WIL contexts, rather than assuming technological proficiency alone. Ultimately, this review establishes that the AI-driven era is not a future scenario but a present reality actively reshaping WIL scholarship and practice. The task ahead is to ensure that as WIL becomes increasingly intelligent, it also remains profoundly human.

7. Limitations and Future Directions

While this review provides a comprehensive mapping of WIL research in AI-driven contexts, several limitations must be acknowledged. First, the analysis relies exclusively on the WoS database, which prioritises English-language, high-impact articles. This inevitably excludes significant non-English publications, conference proceedings, and grey literature. Consequently, the findings may be skewed towards dominant scholarly discourses and established research communities, potentially overlooking emerging, practice-oriented, or regionally grounded contributions that are not indexed in WoS. Second, the ethical complexities and subjective experiences of AI-mediated WIL remain outside the scope of this chapter. These limitations delineate clear pathways for future inquiry. Subsequent research should employ multidatabase reviews, incorporating Scopus, regional indexes, and grey literature sources to construct a more geographically and linguistically inclusive knowledge base. Furthermore, longitudinal and predictive studies could track the real-world implementation and efficacy of AI tools in WIL settings, assessing their impact on learning outcomes, professional identity, and graduate trajectories. Finally, dedicated research must address the contextual adaptation of AI-WIL models for underrepresented regions and sectors, ensuring that the development of the field promotes inclusive, equitable, and socially responsible futures of work and learning.

8. Declarations

Funding: This research did not receive any external funding.

Conflicts of Interest: The author(s) declare no conflict of interest.

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