

Research Article - Peer reviewed

A bibliographic mapping of work-integrated learning in South Africa

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Abstract

Research in the field of work-integrated learning (WIL) is growing worldwide. South Africa has been implementing WIL in higher education, especially at universities of technologies for decades to enhance the learning experience and employability of students. While there is expertise on the implementation of WIL from a South African perspective an overall picture of the WIL research landscape in South Africa is unclear. This article provides a better understanding of the most influential papers and researchers that can assist researchers in identifying research collaborators and publishing opportunities. To get a snapshot of the current research on WIL in South Africa, a bibliographic mapping was conducted. The objectives were to determine the extent of recent WIL research in South Africa using bibliographic techniques and to identify how the WIL articles included in the study are interconnected. Using the Scopus database, 127 articles were included in the bibliographic mapping. The results included the author keyword co-occurrence, citation, co-authorship, bibliographic coupling and co-citation networks. The results provide an overview of the current research on WIL in South Africa and identified that there are authors and institutions in South Africa that are driving the research of WIL as well as collaboration with the international community that positions South Africa in the WIL research landscape. It is hoped that similar research will be conducted in future to provide new insights as the field evolves.

Keywords: Bibliographic mapping, South Africa, VOS Viewer, Work-integrated learning

How to cite

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Introduction

Current bibliographic mapping of WIL internationally, shows that South Africa is an important contributor to WIL research globally together with Australia, UK and the USA (Areskoug Josefsson et al., 2024; Ademuyiwa et al., 2024). While the rest of the influential countries are regarded as developed countries, South Africa is a developing country with unique challenges that can provide an alternative perspective on WIL.

The current conceptualization of WIL is mainly from a Western Anglo-Saxon perspective, where countries like Australia, Canada and New Zealand are prominent. However, this perspective might be insufficient for capturing the reality in the African context, regarding culture, higher education history and demographic and societal challenges regarding education and employment. While some prominent international WIL authors, like Jackson (2015) and Dean (2025) focus on employability in their conceptualization of WIL, the relevance of this research of WIL and employability is unclear in the South African context. Therefore, it is essential to obtain a picture of how WIL is understood and the literature that are cited by authors in the South African context.

In South Africa, work-integrated learning (WIL) is regarded as a way to develop graduate attributes and provide practical experience to students to prepare them for the challenges of the workplace (Winberg et al., 2011). The youth unemployment rate in South Africa is 46.1% for individuals between 15-34 years of age. This is much higher than the national average of 33.2% for the second quarter of 2025, although the unemployment rate for graduates is much lower (12.2%) but still worrying (StatsSA, 2025). StatsSA's (2024) research indicates that youth with some work experience outperform those without any experience by four to one. These results indicate that activities like WIL have a huge impact on employment both for the individual and society.

Winberg et al., (2011) in the *Work-integrated learning: Good practice Guide* developed for the Council for Higher Education (CHE) in South Africa encourages higher education institutions to provide opportunities in curriculums for work experience-related activities, referred to as WIL. In this document, work-integrated learning has a broad scope and includes, amongst others, workplace-based learning, work-based experience, problem-based learning and project-based learning. In this guide, WIL is defined as "an umbrella term to describe curricular, pedagogic and assessment practices, across a range of academic disciplines that integrate formal learning and workplace concerns" (p. 4). The definition proposed by the CHE aligns with the focus that WIL is an approach that integrates theoretical knowledge with practical experience gained from the workplace (Africa et al., 2025).

In the South African environment, higher education institutions include universities and technical and vocational education and training (TVET) colleges. Universities in the South African environment consist of different institutional types, based on their purpose and specialisation, namely research universities, comprehensive universities and universities of technology. Traditionally various forms of WIL have always been part of universities of technologies, while at the traditional universities, only qualifications geared toward a specific profession offered WIL experiences, usually as part of the curriculum e.g. health sciences, law and education (Africa et al., 2025).

Despite South Africa's strong contribution to global WIL research, there is a limited systematic overview of the research that has been done in the field from a bibliographic perspective. Bibliometrics and bibliographic reviews can support an increased understanding of the scientific output and future publication strategies in a research community (Hallinger & Kovačević, 2023). By using special programmes, bibliographic analysis can create visual networks of internal, national, and international publication collaboration, sources of publications, and keywords. Such bibliographic presentations provide knowledge of the structure of the research field and its development (Block & Fisch, 2020) providing a historical overview as well as potentially predicting future trends (Gan et al., 2022). By capturing key components of outputs like title, authors, year of publication etc., bibliographic reviews provide information to researchers to quickly identify published literature and enhancing their research (Gan et al., 2022).

This article provides some insight in the work that has been done in South Africa that can be used as a starting point of the most influential scholars and institutions. A bibliographic map of South African WIL research contributions can help to identify knowledge gaps and collaboration opportunities. In addition, the findings may influence South Africa's role in global WIL discourse.

Due to the importance of WIL in the South African context, this bibliographic mapping will provide a better understanding of research that have been done in South Africa on WIL. This will enable scholars that do research in WIL to have an overview of the current influential South African organizations, articles and authors. This article aims to answer

the following research questions:

- What is the extent of WIL research in recent articles in South Africa according to bibliographic techniques?
- How are these WIL research articles interconnected?

Method

A bibliographic mapping was undertaken to reach the objectives of the paper. While a bibliographic review focuses on the qualitative results focusing on findings and contributions, the focus of the bibliographic mapping is on quantifying through the use of specific techniques (co-citation etc.) to visualize the structure and dynamic relationships between documents in a field (Grant & Booth, 2009; Zupic & Cater, 2015).

While there are limited guidance on the structure of the bibliographic mapping and reviews (Block & Fisch, 2020), the mapping process utilised the principles by Arksey and O'Malley (2005) and Levac et al. (2010) that follows five stages, namely the identification of the research questions, identifying relevant studies, the selection of the sources, charting the data and reporting the results. The bibliographic mapping has a structured and systematic data identification process, similar to that of a systematic literature review.

The Scopus database was used to identify sources due to its wider coverage of high-quality, peer-reviewed literature across many disciplines, along with tools to analyse this content (Baas et al., 2020). The search was limited to articles explicitly using WIL in either their title, abstract or keywords and being published by researchers affiliated with South African universities. The structured search was conducted on August 8, 2024, with the following search terms: {work integrated learning} OR {work-integrated learning} in "title, abstract, keywords" and an additional field of affiliation country {South Africa} was added, and this yield 174 sources. Using the "refine search options" in Scopus, the Language was set to only English sources (174 sources) and restricted to sources in the final publication stage (172 sources). The document type was set to only articles (136 sources), and lastly, the range was set to only include articles from 2008-2024 (128 articles). After a manual check, 1 article was removed as it was not affiliated with a South African university (127 articles). No further limitations were used. The search results yielded 127 articles that could be analysed.

The results of the search were saved and analysed utilizing VOSViewer, a program that enables bibliographic visualization of citations, co-citations, and bibliographic coupling. A thesaurus was used in VOSviewer to clean the data for institutions to ensure the correctness and quality of the data. The first research objective was addressed by looking at the citations, co-citation and bibliographic coupling of authors and institutions while the second objective was specifically addressed by looking at the co-citation, bibliographic coupling and citation of articles.

Results

As part of the results, the most common features of bibliographic mapping are discussed, namely author keyword co-occurrence, citation, co-authorship, bibliographic coupling and co-citation networks.

The identified WIL research articles were in various disciplines, with 46% of the articles in Social Sciences, 17% in Economic and Management Sciences, 7% in Medicine and 5% in Psychology according to the Scopus database of 2024. Of the 127 articles, 24% were single authored. The number of articles shows a steady growth year after year, with 56% of the articles being published in the last five years.

Keyword Co-occurrence

In VOSViewer, keyword co-occurrence is the number of times a keyword is listed as a keyword by the authors in the included articles. Co-occurrences measure the repetition of the same keywords across publications (van Eck & Waltman, 2014). Keyword co-occurrence maps the thematic similarity between documents (Pandey et al., 2024).

When examining all the author keywords listed in the included articles, those in Table 1 indicate keywords that had at least four or more occurrences in the articles.

Table 1: Occurrences of author keywords in articles

Keyword	Occurrences	Total link strength
Work-integrated learning	43	56
South Africa	11	14
Work integrated learning	13	11
Work-integrated learning (WIL)	9	5
Experiential learning	7	12
Students	6	10
Higher education	6	7
Employability skills	5	10
Graduate employability	5	8
Curriculum	5	7
Employability	5	7
Covid-19	4	9

In total, 450 keywords were listed by authors, with 11 keywords having 5 or more occurrences. Work-integrated learning appears more than once in table 1 due to each keyword being considered as a separate item if there is a hyphen or a parenthesis included in the keyword in the article. The most prominent key word is work-integrated learning, following with key words that have a strong emphasis on employability.

Citations

Citations refer to the number of citations received by a publication or an author (Van Eck & Waltman, 2014). The heading, “Articles” in table 2, refers to the number of articles by the author. Table 2 is organised according to the number of citations per author. For an author to be included in the Table, a cut-off of 10 citations and 1 article was used. While 260 authors have been identified, there were nine authors with more than 20 citations.

Table 2: Citations per author

Author	Citations	Articles
Dhliwayo, Shepherd	80	1
Spowart, Jane	59	1
Ramsaroop, Sarita	33	2
Mutereko, Sybert	27	1
Wedekind, Volker	27	1
Petersen, Nadine	24	3
Uleanya, Chinaza	23	3
Gamede, Bongani	22	2
Gravett, Sarah	21	1
Govender, Cookie	17	2
Taylor, Susanne	17	2
Nel, Carisma	16	2
Brink, Roelien	14	1
Marais, Elma	14	2
Rusznayak, Lee	14	4
Henning, Elizabeth	12	1
Petker, Gadija	12	1
Lawrence, Heather	11	1
Naidoo, Kathleen	11	2
Nenzhelele, Tshilidzi	11	1
Stein, Christopher	11	1
Adefuye, Anthonio	10	1
Bertram, Carol	10	2
Jama, Mpho	10	1
Mothibi, Jani	10	1

The two authors with the most citations are Shepherd Dhliwayo and Jane Spowart. Sarita Ramsaroop had the third most citations, while the other authors in Table 2 had less than 30 citations. For Dhliwayo and Spowart the citations were based on one article, while Ramsaroop had two articles. The title of the article by Dhliwayo (2008) is *Experiential learning in entrepreneurship education: A Prospective model for South African tertiary institutions* and the title of the article by Spowart (2011) is *Hospitality students' competencies: Are they work ready?* Both these articles were single author articles. The articles by Ramsaroop were both with co-authors, namely

- Gravett & Ramsaroop (2015), *Bridging theory and practice in teacher education: Teaching schools – a bridge to far?* and
- Ramsaroop & Petersen (2020), *Building professional competencies through a service learning 'gallery walk' in primary school teacher education.*

Table 3 provides the titles of articles by the most productive authors.

Table 3: Titles of articles by most productive SA authors on WIL

Author	Year	Title	Journal
Rusznyak, L & Bertram, C	2021	Conceptualising work-integrating learning to support pre-service teachers' pedagogic reasoning	Journal of Education
Rusznyak, L	2022	Using semantic pathways to reveal the "depth: of pre-service teachers' reflections	Education as Change
Langsford, D & Rusznyak, L	2024	Observing complexity in teachers' choices: Preparing preservice teachers for work-integrated learning	Education as Change
Bertram, C. & Rusznyak, L	2024	Navigating tensions in designing a curriculum that prepares preservice teachers for school-based learning	Education as Change
Ramsaroop, S & Peterson, N	2020	Building professional competencies through a service learning 'gallery walk' in primary school teacher education	Journal of University Teaching and Learning Practice
Glietenberg, SH, Petersen, N & Carolin, A	2022	Teacher educators' experiences of the shift to remote teaching and learning due to COVID-19	South African Journal of Childhood Education
Henning, E, Petker, G & Petersen, N	2015	University-affiliated schools as sites for research learning in pre-service teacher education	South African Journal of Education
Uleanya, C	2019	Comprehensive universities timetabling nexus productivity	South African Review of Sociology
Gamede, BT & Uleanya, C	2019	Impact of entrepreneurship education on business organisations	Journal of Entrepreneurship Education
Gamede, BT & Uleanya, C	2018	Entrepreneurship: solution to unemployment and development in rural communities	Journal of Entrepreneurship Education

The most productive authors are Rusznyak, Peterson and Uleanya and they work most often with co-authors. Most of the articles by the most productive authors are in the field of Education.

Citations by Institution

Table 4 presents the affiliated South African institutions organised by citations. Only institutions with at least 1 article and a minimum of 10 citations were included.

Table 4: Citation by institution

Institution	Articles	Citations
University of Johannesburg (UJ)	27	187
University of South Africa (UNISA)	14	117
Cape Peninsula University of Technology (CPUT)	15	52
North-West University (NWU)	14	48
University of KwaZulu-Natal (UKZN)	6	48
University of Zululand (UZ)	4	26
Tshwane University of Technology (TUT)	7	21
University of the Witwatersrand (WITS)	5	20
University of the Free State (UFS)	9	19
University of Pretoria (UP)	9	18
Central University of Technology (CUT)	4	17
Durban University of Technology (DUT)	11	11

The institutions that have by far the most citations are the University of Johannesburg (UJ) and the University of South Africa (UNISA) (above 100 citations) followed by the Cape Peninsula University of Technology (CPUT).

The institutions with more than 10 articles are the University of Johannesburg, Cape Peninsula University of Technology, University of South Africa, North-West University (NWU) and Durban University of Technology (DUT).

Co-authorship

Co-authorship refers to authors, institutions or countries that publish together (Van Eck & Waltman, 2014). Co-authorship indicates that authors are communicating with each other and sharing ideas, resources and/or technology for innovation (Pandey et al., 2024).

Co-authorship among South African-affiliated Authors

When looking at South African-affiliated authors, twenty-two authors were identified as co-authors, with at least 1 article and a minimum of 10 citations. Not all the authors are linked although there are clusters of authors that work together. The two authors with the highest citations do not form part of a cluster (Dhliwayo and Spowart); it is only Ramsaroop that forms part of a cluster. There are five authors that have co-authorship with at least one article. Nadine Petersen has co-authorship with three of the 4 authors, namely Henning, Petker and Ramsaroop. While Ramsaroop has co-authorship with two other authors, namely Petersen and Gravett. Various smaller clusters can be identified, with little link strength amongst the clusters.

Co-authorship by Country

From an international perspective, South African authors have co-authored with 16 countries from several parts of the world. The criteria were set for a minimum of 1 article. South Africa co-authors with African countries like Ghana, Zimbabwe, Botswana Malawi, Namibia, Nigeria and Swaziland. There is also co-authorship with Australia, United Kingdom, Malaysia, Denmark, Sweden, Canada and Ireland. The countries with which South Africa has the most co-authorship are the United Kingdom and Australia (3 articles each), followed by Namibia with 2 articles. The single article with the most citations with co-authorship is one with Namibia on *Using simulations to improve skills needed for work-integrated learning before and during COVID-19 in Namibia by Ipinge, Batholmeus and Pop (2020)*. While the citations with Australia are also 9, the citation value is based on two articles.

Co-authorship by Institution

To get a better understanding of the co-authorship per institution, institutions with more than 1 article and 10 citations were included. Twelve institutions met the threshold and are indicated in Figure 1.

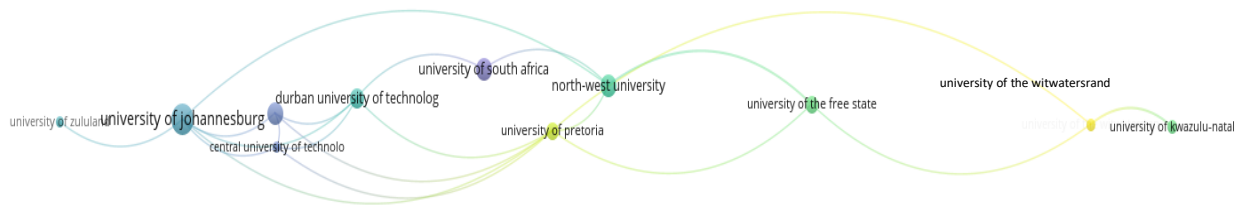


Figure 1: Co-authorship in largest cluster (picture from VoSviewer)
Not all institutions are included in the cluster

When looking at co-authorship with institutions, there are 12 South African institutions identified with five or more articles. Those with the most co-authorship is UJ, CPUT, NWU, UNISA and DUT ranging from 27 articles to 11. All these universities are either comprehensive universities or a university of technology where WIL is paramount in academic programmes and research in this area would therefore be important.

The institutions with the highest citations for co-authorship are UJ and UNISA followed by CPUT, UKZN and NWU. Of the 12 institutions, 11 were linked in terms of co-authorship, but only TUT was not included in the link (Figure 1).

The co-authorship indicates that the University of Johannesburg (UJ) and University of South Africa (UNISA) had the most citations, with UJ having various links with other institutions namely Durban University of Technology (DUT), University of Pretoria (UP) and North West University (NWU).

Bibliographic Coupling

Bibliographic coupling refers to the overlap in the reference lists of articles and the number of references shared by articles (Haghani et al., 2021; Van Eck & Waltman, 2014). The more references shared between the two documents, the stronger their connection in a bibliographic network and the more likely they share a conceptual common ground (Montecchi et al., 2021).

Bibliographic Coupling per Authors

For the bibliographic coupling of authors, 260 authors were identified. With the threshold set with a minimum of one publication and 10 citations, 24 authors met the criteria. The results are indicated in Table 5 according to link strength.

Table 5: Bibliographic coupling of authors

Author	Publications	Citations	Total link strength
Rusznyak, Lee	4	14	226
Bertram, Carol	2	10	217
Petersen, Nadine	3	24	171
Ramsaroop, Sarita	2	33	129
Govender, Cookie	2	17	90
Taylor, Susanne	2	17	90
Henning, Elizabeth	1	12	81
Petker, Gadija	1	12	81
Adefuye, Anthonio	1	10	80
Jama, Mpho	1	10	80
Mothibi, Jani	1	10	80
Lawrence, Heather	1	11	66
Naidoo, Kathleen	2	11	66
Stein, Christopher	1	11	66
Nel, Carisma	2	16	57
Gamede, Bongani	2	22	53
Uleanya, Chinaza	3	23	53
Marais, Elmal	2	14	51
Gravett, Sarah	1	21	42
Mutereko, Sybert	1	27	33
Wedekind, Volker	1	27	33
Brink, Roelien	1	14	7
Dhliwayo, Shepherd	1	80	5
Nenzhelele, Tshilidzi	1	11	3

Four authors had a total link strength higher than a hundred, namely, Rusznyak, Bertram, Petersen and Ramsaroop that indicate stronger bibliographic coupling. The author with the highest citations Dhilwayo (80 citations), does not have high link strength, this indicates Dhilwayo's work is rarely coupled bibliographically with other often cited authors in the sample.

Bibliographic coupling per Institution

To identify the bibliographic coupling of institutions, the threshold was at least one article with 10 citations. The bibliographic coupling is visually depicted in Figure 2.



Figure 2: Bibliographic coupling between institutions (picture from VoSviewer)
Not all institutions are included in the visualisation

In terms of bibliographic coupling, the institutions with the highest citations (and therefore bigger nodes) are the University of Johannesburg (UJ), University of South Africa (UNISA), followed by the Cape Peninsula University of Technology (CPUT), North-West University (NWU) and the University of Kwazulu-Natal (UKZN).

In terms of bibliographic coupling between institutions, the institutions that share the most references are those with the thicker lines between them, namely and are Durban University of Technology (DUT), University of Johannesburg (UJ), Cape Peninsula University of Technology (CPUT), University of Pretoria (UP) and North-West University (NWU).

Co-citation

Co-citation happens when two publications are co-cited by a third publication. The more publications that co-cite the two publications, the stronger the co-citation link between the two publications (Van Eck & Waltman, 2014). According to Pandey et al. (2021:8), co-citation networks assist in identifying “conceptual clusters based on highly cited publications with the knowledge foundation”. This assists in identifying journal and author clusters.

Co-citation of Authors

Of the 7184 authors in the co-citations, there were 11 authors with a minimum of 15 citations (Figure 3).

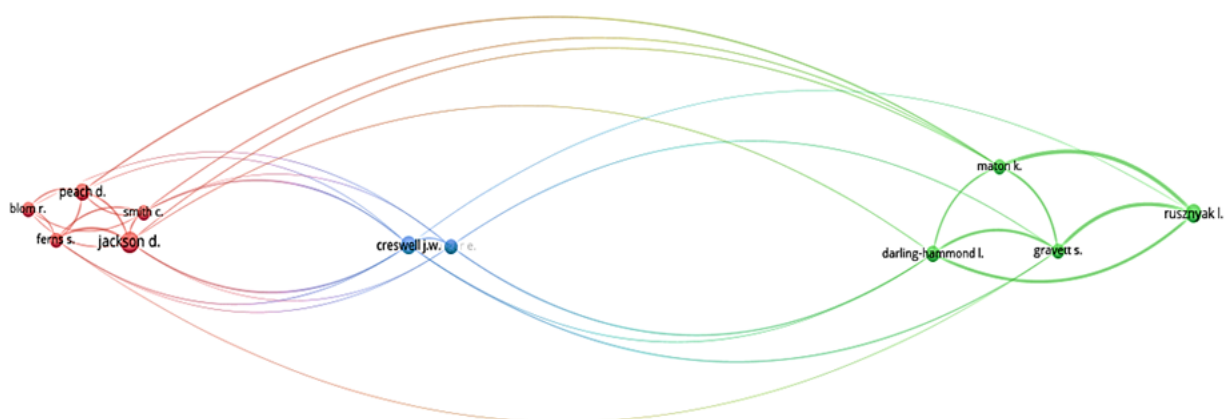


Figure 3: Co-citations of authors (picture from VoSviewer) Not all authors with citations above 15 are included in the cluster

From the network visualisation, three clusters emerged. The first cluster is based on authors working in WIL. The authors most cited in this cluster are Jackson, Peach, Smith, Ferns and Blom (cluster on left in red). The first four authors are Australian, while Blom is a South African author. The second cluster in the middle is based on research design and the author most cited is Creswell. The third cluster (on the right, in green) focuses on authors publishing in Education and Teaching, with Darling-Hammond and Maton, Gravett and Rusznyak being the most cited. Darling-Hammond (USA) and Maton (Australia) are international authors, while Gravett and Ruznyak are South African authors.

The authors with a close connection are those in the cluster of Education, Rusznyak had the strongest link strength followed by Maton and Gravett.

Co-citation of Journals

The network visualisation shows the connection between journals identified in the study. Figure 4 provides a network visualisation of the co-citation of the 30 most co-cited journals.

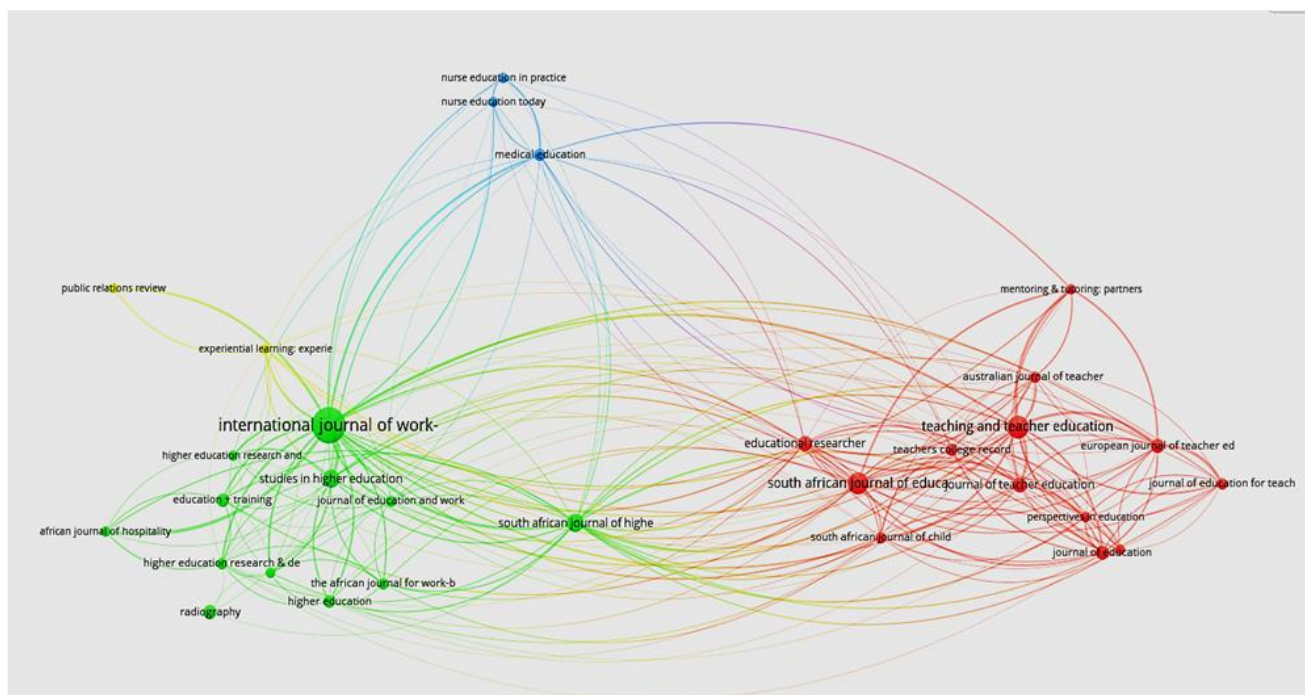


Figure 4: Co-citations of journals (picture from VoSViewer)

From the network visualisation four clusters emerged. Cluster 1 (yellow) was the smallest and contained one journal, *Public Relations Review* and a book by Kolb, *Experiential Learning: experience as the source of learning*. It seems that although these journals are connected, they do not necessarily have a common theme. Cluster 2 (blue) is another smaller cluster and includes titles related to the health sector. The most co-cited journals are *Nurse Education Today*, *Nurse Education in Practice* and *Medical Education*.

The third cluster (red) contains most journals and focuses on Teaching and Education. The journals most often co-cited in this cluster are *Teaching and Teacher Education*, *South African Journal of Education*, *Educational Researcher* and *Journal of Teacher Education*. Cluster 4 (green) is the largest cluster focusing on higher education. The journal most co-cited in this cluster is the *International Journal of Work-integrated Learning* and *Studies in Higher Education*.

To get an idea of the most co-cited journals, the minimum threshold was set at 15 citations, so for a journal to be included, it had to be cited at least 15 times by the articles included in the study. While 2795 sources of publication were identified, only 12 journals met the threshold of at least 15 citations. The journals most often co-cited are listed in Table 6.

Table 6: Co-citations per journals

Source	Citations	Total link strength
International Journal of Work-integrated Learning	116	529
Teaching and Teacher Education	48	394
South African Journal of Education	44	240
Studies in Higher Education	31	198
South African Journal of Higher Education	30	235
Educational Researcher	22	154
Journal of Teacher Education	21	191
Radiography	20	4
Journal of Education (South Africa)	18	187
European Journal of Teacher Education	18	191
Education + Training	17	96
Teachers College Record	15	116

The journal cited most in co-citations was the *International Journal of Work-integrated Learning*. This journal also has the strongest connection of all the journals. This might be because it is the only journal identified that solely focuses on work-integrated learning.

Co-citation of Documents

The documents that were most co-cited are listed in Table 7. A threshold of 5 citations was set as the threshold.

Table 7: Co-citations of documents

Author	Year	Title	Citations
CHE	2011	Work-integrated learning: Good practice guide	16
Jackson, D.	2015	Employability skill development in work-integrated learning: Barriers and best practice	7
Dewey, J.	1938	Experience and Education	5
Maton, K.	2013	Knowledge and knowers: Towards a realist sociology of education	5

The document most co-cited is the Council of Higher Education's good practice guide on WIL followed by Jackson's article on employability skill development.

Discussion

Bibliographic mapping presents valuable insights into the nature and evolution of the knowledge base, to the development of the research field, to identify paradigm shifts and gaps in the production of knowledge and can indicate to scholars the direction of the most influential sources, authors, and articles in the research field (Hallinger & Kovačević, 2023). Findings in the bibliographic mapping complement one another and produce a multifaceted view of the influence of the explored sources, articles and authors (Hallinger & Kovačević, 2023).

Keywords

For this article, a stricter approach was followed by only including articles mentioning WIL in the title, abstract or keywords. This was done to ensure that the articles had a specific focus on WIL, and excluded papers where WIL was a more indirect focus. Despite the stricter identification of articles, the results indicate that South Africa has a strong interest in WIL with a growing publication rate in WIL and will most likely continue to play an important role in this research field. South Africa has a rich history of Universities of Technologies that are using WIL for decades as part of their programme structure.

It is also important to note that, as identified in Areskoug Josefsson et al. (2024), work-integrated learning with a hyphen has more occurrences than those without. The use of the hyphen can affect how the article is found in literature searches (Salvador-Oliván et al., 2019). The use of WIL with or without a hyphen can be due to citing different important

articles in the research area or linguistic barriers, as English is most often not the native language of researchers. This is an important consideration for authors when choosing their keywords, as it can affect how the keyword is selected by search engines in search for specific research articles.

Countries

There is co-authorship with various other countries. The results indicate co-authorship with many African countries with the most citations with co-authorship from Namibia. The countries with which South Africa has the most co-authorship are the United Kingdom and Australia and Namibia. While it is good to see the strong collaboration with African countries, the collaboration with countries from various parts of the world positions South Africa in the larger WIL landscape.

Authors

The bibliographic mapping shows that South Africa is publishing on WIL with a steady increase in research articles published annually. The most productive article writing authors in WIL in South Africa are Lee Rusznyak, Nadine Petersen and Chinaza Uleanya. Rusznyak had one single author article, and the rest were with co-authors. While there are many authors in the field, these authors had two articles while the rest only had one article. Interestingly, the most productive authors do not have the highest citations.

The highest citations are from Dhliwayo and Spowart. The article of Dhliwayo is rarely bibliographically coupled with other cited authors. The article by Dhliwayo focuses on a model of entrepreneurship education and the article by Spowart on competencies for work readiness, indicating the strong link with employability as entrepreneurship is seen as an alternative entry way to employability.

Peterson has strong co-authorship followed by Ramsaroop. Both Peterson and Ramsaroop and all their co-authors in this cluster are affiliated with the same university, namely the University of Johannesburg and the research is in the field of Education, more specific teacher education. Rusznyak, Bertram, Petersen and Ramsaroop also had the strongest link strength indicating that they are bibliographically coupled. This implies that the body of conceptual grounding might be similar. Three clusters were identified with co-citation. Those in WIL that are most cited are Jackson, Peach, Smith, Ferns and Blom. In the Education cluster the most co-citations are Rusznyak and Gravett together with Maton and Darling Hammond. This could be due to the many WIL research articles in the field of Education. WIL is also used extensively in teacher education. The fields of Education/Teaching are closely related to WIL.

Peterson has strong co-authorship and is bibliographic coupled with Rusznyak, indicating that the body of conceptual grounding might be similar. Co-cited authors are Rusznyak and Gravett in the field of Education and Blom in relation to WIL.

While the current researchers on WIL highlights a strong basis in Education which could be seen as the natural home of WIL research in the South African context. The articles included in this study represent different discipline fields, namely social sciences, economic and management sciences and health, showing interest from other discipline fields. The articles by Dhliwayo and Spowart illustrates the link with employability and entrepreneurship that is becoming a focus area in many South African universities due to the current economic circumstances. In this case, the work of Jackson has been cited, showing the relevance of the work of Jackson in the South African context. Further research can focus more on unpacking the relevance of the work of international authors like Jackson to South African circumstances. This can contribute to identifying a more nuanced perspective on the conceptualization of WIL, from a developing context that might enrich the current view on WIL.

Institutions

The institutions that deliver most articles on WIL are UJ, CPUT, UNISA and NWU. In the South African environment, universities are divided into three types of institutions, based on their purpose and specialisation. Research-based universities produce research-based knowledge and present traditional academic programmes. Comprehensive universities were formed through mergers between a traditional university and what was previously known as Technikons. Comprehensive universities focus on teaching and applied research relevant to industry. These institutions offer both traditional academic programmes as well as Technikon programmes and conduct applied research. Universities of

Technologies provide industry-related knowledge and specialisation. The primary function of universities of technology is teaching and applied research (Ntshoe & Selesho, 2014). TVET colleges in South Africa focus on ‘the study of technologies and related sciences, practical skills acquisition and knowledge related to various economic and social life careers’ (Mesuwini et al., 2023:83). While TVET colleges provide vocational qualifications (certificates and diplomas) with qualifications on the National Qualifications Framework up to level 6, universities offer qualifications up to level 10. Table 8 classifies the universities in South Africa according to institutional type.

Table 8: Type of university (Compiled from Ntshoe & Selesho, 2014)

Research universities	Universities of Technology	Comprehensive universities
University of KwaZulu-Natal (UKZN)	Cape Peninsula University of Technology (CPUT)	University of Johannesburg (UJ)
University of Pretoria (UP)	Central University of Technology (CUT)	University of South Africa (UNISA)
Stellenbosch University (SU)	Tshwane University of Technology (TUT)	Nelson Mandela University (NMU)
University of Cape Town (UCT)	Durban University of Technology (DUT)	University of Zululand (UZ)*
University of the Witwatersrand (WITS)	Mangosuthu University of Technology (MUT)	Walter Sisulu University (WSU)*
University of the Free State (UFS)	Vaal University of Technology (VUT)	University of Venda (UV)*
University of Limpopo (UL)*		
University of Fort Hare (UFH)*		
Rhodes University (RU)		
University of the Western Cape (UWC)*		
Sol Plaatjie University (SPU)		
North-West University (NWU)		

*Historically disadvantaged universities

One would expect more articles on WIL at the universities of technologies and the comprehensive universities, which is the case if one looks at the citations and number of articles produced by these institutions. It was interesting to note that two of the institutions were comprehensive universities, with one research university and one university of technology.

There are various clusters with co-authorship with the most active co-authorships between UJ and CPUT. In addition to the local co-authorship, the findings indicate that South Africa has co-authorship with other African countries and international representation.

The institutions that are bibliographically coupled are UJ, UNISA, CPUT, NWU and UKZN. The institutions in close proximity (UJ, UNISA) share more references, and one can see that the University of Johannesburg (UJ) and the University of South Africa (UNISA) form two nodes to which other universities are connected. These two universities also share many references and are strongly connected.

The findings indicate that various institutions in South Africa are interested in WIL and there are collaboration amongst the institutions and the work done by other institutions are acknowledged.

Journals

Various clusters of co-citations of journals emerged with journals co-cited in the field of Nursing, Teacher Education, Higher Education and WIL/Experiential learning. The most co-cited journal was the *International Journal of Work-integrated Learning* and *Studies in Higher Education*. The three most cited South African journals are *South African Journal of Higher Education*, *South African Journal of Education* and the *Journal of Education (South Africa)*.

While research is published in South African journals, South African authors also publish their work in international journals expanding their footprint to a broader international audience, positioning South Africa in the international community on WIL research.

Document

The document most co-cited is the Council of Higher Education's good practice guide on WIL. This is a South African resource and provides contextualisation to the implementation of WIL in SA. This is followed by Jackson's article on Employability skill development in WIL, again focusing on the importance of WIL in the context of employability.

The two most cited documents, one home grown and one international, indicates the prominence of the South African document, while dated (2011 publication), seems to still be very relevant to the South African WIL research community. The article by Jackson, supports the need for creating employability opportunities through enhanced skill development that South African universities are currently grappling with. The combined use of these two documents highlights the notion of learning from the international community but ensuring that the WIL research translates to local relevance.

Conclusion

The objectives of this study were to determine the extent of current WIL research in South Africa through a bibliographic mapping using bibliographic techniques and to identify how the WIL research articles included in the study are interconnected. The results present a current snapshot of published WIL research. The results indicated that increasing research is being done in the field of WIL in South Africa.

Some limitations have been identified. A potential limitation is the small sample size, which affects the possibility of setting a limit with a higher number of citations or articles identified for inclusion in the study. This is due to the risk of data becoming too small to visualise relevant bibliographic coupling (Van Eck & Waltman, 2014). Another limitation is potential errors in metadata, that are not fixed by using a system thesaurus. With smaller amounts of data, the risk of the effect of metadata errors is greater than with larger amounts of data. Another potential limitation to the data set could be that the authors only considered articles that had mentioned WIL in the title, abstract or keywords. Therefore, articles that did not explicitly use the word WIL were excluded due to the search strategy.

Furthermore, only the Scopus database was used to identify articles. This selection was made so that the information available is the same for all identified articles. A further limitation concerns bibliographic coupling as a linkage through bibliographic coupling may be due to unrelated content in the specific article (Mas-Tur et al., 2021). This limitation has been minimised by narrowing the search to include only articles that contained the term WIL in the title, abstract and keywords.

It is recommended that the study be repeated by broadening the search to include other databases to ensure that all articles in the field of WIL are identified. Terms related to WIL could also be included to widen the search for work in the field; these terms include co-operative education, internships, workplace learning, work-based learning, project-based learning, etc. However, in this study the focus was explicitly on the term WIL, as research using this term is increasing (Areskoug Josefsson et al., 2024; Ademuyiwa et al., 2024). The inclusion of other documents, like conference publications and other types of documents could provide a more holistic view of the work that is currently happening in the field of WIL in South Africa. In addition, bibliographic coupling has been criticized for not always identifying actual conceptual similarities within documents (Singh et al., 2024).

Further information could be included related to the research questions, topics and methodologies used in the studies to obtain further information on the trends in the research in South Africa on WIL. It is also advised that the study is repeated in a few years to see how the data evolves.

The article provides a snapshot of the current research in articles on WIL in South Africa with the most productive authors and institutions and the discipline fields that published most on WIL. The article showcases that South African research on WIL has a strong employability focus and the work done in Education is the dominant narrative of WIL in South Africa currently. The guidance document of the CHE, although old, still forms a foundational text in the research on WIL. South African authors publish not only in South African journals but also consider overseas journals for their work. This bibliographic mapping provides a roadmap to new researchers in the field but is also of value to experienced researchers considering doing research on WIL in SA. This type of research will assist with further collaboration between authors and institutions and the evolution of the knowledge base on WIL to enrich learning and teaching practices.

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Declaration of interests

The authors declare no competing interests.

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