A bibliometric analysis of the graduate employability research trends

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Article Info

ABSTRACT

Graduate employability has received considerable attention over the years, owing to the labor market's desire for highly skilled graduates. This study was to examine trends in graduate employability research from 1986 to 2020 through the use of a standard bibliometric procedure. During the study period, as many 343 documents were yielded from the Scopus database. The findings indicated that the relative growth rate of published article was 69 documents per year on average. Geographically, the United Kingdom ranked first as the most productive country, with 104 articles published. Between 2000-2010, the employability topic focused primarily on the role of higher education in providing appropriate career guidance and strategy development for graduates from both public and private institutions seeking employment. Between 2011-2019, the focus shifted to employability skills, work-integrated learning, and curriculum designs that are connected to the long-term enhancement of graduate employability and its impact on career goals. The findings of this study indicate a significant increase in graduate employability literature, as well as a significant number of citations. Academic researchers are encouraged to pursue development strategies that result in successful graduates finding employment in the labor market. This paper is innovative in that it identifies a trend and future for research in the field of employability.

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1. INTRODUCTION

The idea of employability has been introduced over the last few decades. The concept of employability (GE) has been attributed to an individual's perceived ability to attain and maintain employment in the career lifetime [1]–[3]. Scholars have noted that employability, particularly among graduates has been a constant focus of most higher education institutions [4]–[6]. Graduate employability is a sub-field of higher education research related to career development that was associated with employability skills [7]–[9]. Similarly, GE has been viewed as a psychosocial learning process for developing career aspirations and proactively engaging in self-career managed behaviors [10], [11].

The occurrence of COVID-19 pandemic has caused the global economy to bear damaging impact, especially many countries reporting critical rises in levels of unemployment [12]. New research from the Organization for Economic Co-operation and Development 2021 (OECD) highlighted that the number of

university graduates is expected to reach 300 million by 2030, reflecting on the world's growing investment in higher education [13]. As a result, the number of graduate recruitment has slowed down and there is low certainty about moving into real life working [14]. Despite the growing numbers of GE studies, there is a scarcity of studies that investigate and analyze career development publications in worldwide [9], [15]. The central emphasis of graduate employability was commonly due to a mismatch between graduate skills and employer demands which creates a gap. The employers deemed for more adaptable and flexible graduates and sought those with competence to fit in with the organization for a long term [16].

In this paper, researchers create a visualized map using the free mapping software VOSviewer 1.6.16. Meanwhile, the literature on the use of data mining processes from Scopus database has analyzed a macroscopic overview of the main characteristics of GE publications. Scopus has a broader coverage of journal titles than Web of Sciences (WoS) [17]. On the other hand, WoS has a broader scope in some subjects, such as the humanities [18]. The journal coverage in GE studies was hardly found in WoS rather than Scopus, resulting in the bibliographic database not being accessed in WoS [19]. Therefore, this study retrieved documents from Scopus that is referred to as a high-quality web source that covers more readily available topics than WoS, which only focuses on specialization sub-fields within scientific disciplines [20].

This paper will be useful for individuals and multiple stakeholders to reflect on underlying trends in GE from authors, journals, countries, institutions, references, and research topics and to make future recommendations. Although this study intends to analyze 343 research-based articles related to graduate employability dated back to thirty decades does not appear to be a comprehensive analysis, it does illustrate the utility of bibliometric techniques to discover hidden information spaces [21].

2. RESEARCH METHOD

Bibliometric analysis study is a quantitative cross-disciplinary science that allows scholars to study trends in a specific research area based on the results of a published literature database [22]. This bibliometric analysis paper profoundly has different approach than a review paper [23], which focuses on the analysis of co-citations, keywords occurrence, geographical distribution, and future directions of a specific topic of interest. Furthermore, bibliometric analysis allows scholars to share their findings with other scholars working in the same field, which can lead to opportunities for collaboration [24].

2.1. Data mining and search strategy

Data mining was carried out on March 30, 2021 using the Scopus database. Scopus, along with the WoS, is the largest database that compiles various scientific records and is considered the most frequently used source in publication and data collection for bibliometric studies [25]. The study's central topic of interest is research articles and journals that both titles and abstracts have keywords of "graduate employability". The earliest publication was discovered in 1986, and the most recent was in 2020. The publication year 2021 is not included in the search for research articles.

The initial search using query strings TITLE-ABS-KEY ("graduate* employability") AND (LIMIT-TO (OA, "all")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SCRTYPE , "j")), yielded 677 documents. In the second stage, such documents with terms, for example, progress, review, critical, analysis, highlight, in the title and abstract were removed to exclude review papers. From the 432 articles that remained, further screening process identified 89 review articles to be excluded; their EIDs were retrieved and entered into the search query to ensure that they did not appear in the final result. The final query database contained 343 documents about graduate employability as shown in Figure 1.

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┌─────────────────────────────┐
│ Records identified through  │
│   Scopus database           │
│   searching (N=677)         │
└─────────────────────────────┘
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│ Records screened (Titles,   │
│ Abstract, and Full-text)    │
│ (N=432)                     │
└─────────────────────────────┘
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              │ ────────────────────▶│ Articles excluded with      │
              │                      │ reasons (N=343)             │
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│ Studies included in         │
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│ (N=343)                     │
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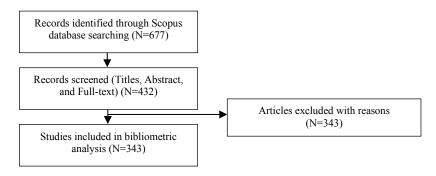
Figure 1. Flowchart of data retrieval of graduate employability publications on Scopus database

To make the search more systematic, an attempt to obtain the author's ID (Scopus field code: UA-ID) may result in accurate data on the author's output. The documents retrieved from the author's profile should present as single-authored publications. The result was then refined to AFFILCOUNTRY code in order to obtain information for single-country publications (SCP) within the search. The search results were refined into specific items such as publication year, source, author, affiliation, country/territory, subject area, and document type (journal/article). For ranking purposes, bibliometric information such as total publications, total citations, CiteScore, and h-index were used in this paper. Figure 2 illustrates the search strategies in detail, including search strings used in Scopus.

Item	Notes	Search string	Results
i.	Original search string	TITLE-ABS-KEY ("graduate* employability")	677
ii.	Add specific criteria	TITLE-ABS-KEY ("graduate* employability") AND (EXCLUDE (PUBYEAR , 2021)) AND (LIMIT-TO (OA , "all")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (LIMIT-TO (SRCTYPE , "j"))	432
iii.	Review articles	(TITLE-ABS ("graduate employability")) AND (TITLE ("recent" OR progress OR review OR critical OR revisit OR advance OR development OR highlight OR perspective OR prospect OR trends OR bibliometric) OR (ABS (progress OR review OR bibliometric)) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (EXCLUDE (PUBYEAR , 2020))	170 89
iv.	Graduate employability without review articles	(TITLE-ABS ("graduate* employability")) AND NOT (EID (*insert EID of review articles here***)) AND (LIMIT-TO (SRCTYPE , "j")) AND (LIMIT-TO (DOCTYPE , "ar")) AND (EXCLUDE (PUBYEAR , 2021))	432–89=343

***EID of review articles:**
(2-s2.0-85097554986 OR 2-s2.0-85099150083 OR 2-s2.0-85091223216 OR 2-s2.0-85089738422 OR 2-s2.0-85086323839 OR 2-s2.0-85085018226 OR 2-s2.0-85099120368 OR 2-s2.0-85079115406 OR 2-s2.0-85100595992 OR 2-s2.0-85088813331 OR 2-s2.0-85085896368 OR 2-s2.0-85091032871 OR 2-s2.0-85090558352 OR 2-s2.0-85087676234 OR 2-s2.0-85077304835 OR 2-s2.0-85094657712 OR 2-s2.0-85086157521 OR 2-s2.0-85097051333 OR 2-s2.0-85064205435 OR 2-s2.0-85074977225 OR 2-s2.0-85056484313 OR 2-s2.0-85058856908 OR 2-s2.0-85073334876 OR 2-s2.0-85071066957 OR 2-s2.0-85085622713 OR 2-s2.0-85077958784 OR 2-s2.0-85078058336 OR 2-s2.0-85069171445 OR 2-s2.0-85075123818 OR 2-s2.0-85064618304 OR 2-s2.0-85065714397 OR 2-s2.0-85068529645 OR 2-s2.0-85055755114 OR 2-s2.0-85060808916 OR 2-s2.0-85052725030 OR 2-s2.0-85066400871 OR 2-s2.0-85020222743 OR 2-s2.0-85041915800 OR 2-s2.0-85055316821 OR 2-s2.0-85041346498 OR 2-s2.0-85063612605 OR 2-s2.0-85040789936 OR 2-s2.0-85045913820 OR 2-s2.0-85045204809 OR 2-s2.0-85019207860 OR 2-s2.0-85033660480 OR 2-s2.0-84984680167 OR 2-s2.0-85021724610 OR 2-s2.0-85034655975 OR 2-s2.0-84969593607 OR 2-s2.0-85026735115 OR 2-s2.0-84952772238 OR 2-s2.0-84937604124 OR 2-s2.0-85014103577 OR 2-s2.0-85015451121 OR 2-s2.0-85031003139 OR 2-s2.0-85021383576 OR 2-s2.0-85029879321 OR 2-s2.0-84976871351 OR 2-s2.0-84958538950 OR 2-s2.0-85006967365 OR 2-s2.0-84969706250 OR 2-s2.0-84965013549 OR 2-s2.0-84975140836 OR 2-s2.0-85069272051 OR 2-s2.0-84947925137 OR 2-s2.0-84921747829 OR 2-s2.0-84924289928 OR 2-s2.0-84952333950 OR 2-s2.0-84924917376 OR 2-s2.0-84924043646 OR 2-s2.0-84900008267 OR 2-s2.0-84980466496 OR 2-s2.0-84926299470 OR 2-s2.0-84880926964 OR 2-s2.0-84880487410 OR 2-s2.0-85015389616 OR 2-s2.0-84876185438 OR 2-s2.0-85078211968 OR 2-s2.0-84865111602 OR 2-s2.0-84864692586 OR 2-s2.0-80052584698 OR 2-s2.0-81355139377 OR 2-s2.0-77955757955 OR 2-s2.0-74949123251 OR 2-s2.0-77951131270 OR 2-s2.0-57649123311 OR 2-s2.0-38149043352 OR 2-s2.0-34249727101))

*data retrieved on March 30, 2021

Figure 2. The search strategies and query strings used in Scopus database

2.2. Bibliometric maps

The citations, bibliographic map, co-citation, or co-authorship networks were used to visualize bibliometric analyses and data retrieval using the VOSviewer (version 1.6.16) program. VOSviewer, a software tool for creating and visualizing bibliometric maps which require all the items to be analyzed [19]. Countries and author keywords were referred to items that were mapped by the software. In visualization techniques, a positive numerical value represents the degree of strength in links between two keywords or between any pair of keywords that occur at the same time (co-occurrence). It can also be visualized as remarks of certain parameters using network visualization (color, circle size, and thickness of connecting lines). Using keyword co-authorship analysis, the strength of collaboration between countries was numerically represented by the number of articles co-authored by two affiliated countries. Likewise, in co-occurrence analysis, the number of keywords in which two keywords take place together represents the relative link strength between author keywords.

The level of research collaborations from 58 countries with 256 authors were selected in the bibliometric mapping for the co-authorship analysis. It is nearly impossible for a single person to complete research in a specific field on their own. Therefore, the country co-authorship analysis was grouped into five continents using VOSviewer software and Microsoft Excel, such as Africa, America, Asia, Europe, and Oceania.

2.2.1. Co-occurrence analysis (co-word analysis)

The Scopus bibliographic database was searched using title and word citation to identify the growth of publications on GE-related research topics over three subperiods: 1986-2000, 2001-2010, and 2011-2020. To run co-occurrence analysis, 947 keywords from 343 published Scopus documents were gathered until the duration of the study. The visualized keywords network techniques were used to obtain a comprehensive overview of the literature, focusing on the relationship between keywords in each sub-period.

The minimum occurrence of a keyword in VOSviewer was set to 5 in this bibliometric visualization approach. The keyword's average publication year, the clusters of co-word analysis and the relative total link strength was viewed on the overlay visualization mode. The average publication year of the documents where the occurrence of keyword took place can be seen from the color of the keyword.

3.   RESULTS AND DISCUSSION

3.1. Analysis of publication output in the GE topic

Over the last 34 years, 343 research articles have been published, as illustrated in Figure 3. The first publication was by Taylor [26] in the Studies in Higher Education journal entitled 'The Employability of Graduates: Differences between Universities', and there was no publication [27], [28] reported until 1999. In the late 1980s, the concept of graduate identity was centered on the knowledge, skills, and attributes acquired in higher education institutions [1], [29] which determines their employment success. From 2010 onwards, particularly after 2014, there was a spot of interest began in the field of graduate employability research, resulting in an increase in the number of publications.

Extra-curricular exposure and university attendance have resulted in more acquired knowledge and competence that influence graduate employability over the course of a degree program [7], [30], [31]. Although personal attributes are the main important factors influencing graduates' ability to find gainful employment after graduation [32], the increasing demands of the labor market have placed challenges in the higher education system toward structural and educational improvements [33]. The emphasis on graduate employability has largely been accepted as key driver for higher education institutions to incorporate a set of graduate attributes [34], [35], work-integrated learning [36]–[38], internships [15], [39], and curriculum designs [40]–[42] as ways to develop and maintain graduate success.

Despite an exponentially increasing number of articles retrieved differently each year, its publication growth was reported to be 69 (20.1%) documents per year on average. However, the annual trend of the graduate employability publications remarks a proportional increase beyond 2016, as illustrated in Figure 3. The number of yearly publications is expected to elevate beyond the year 2020 due to the current pandemic situation, that affects the employment rate. Moreover, despite a lack of attention from researchers over the last decade (2000-2010), there was a significant evolution in the use of terms such as "graduate employability" in the literature and its publications were quite minimal. According to the Scopus database, open-access journals of graduate employability papers were published only 80 articles (23.3%) of the total articles. In the event of articles that are not freely accessible, users are forced to pay a price to acquire access to those articles. Therefore, in order for researchers' publications to obtain a large number of citations and have a stronger impact on research, it is strongly advised that they seek out and attempt to publish in free and open-access journals [43].
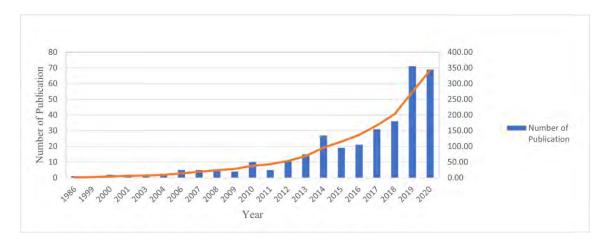

Figure 3. Annual trends of GE-related research articles indexed in Scopus between year of 1986 and 2020

3.2. Most cited journals

Table 1 lists the top 10 most cited GE papers as revealed by the six different publishers. Taylor and Francis published the top three journals, totaling four, and the remaining journals were published by Emerald, SAGE, Deakin University, and the International Journal of Work-Integrated Learning. The journal with the greatest number of publications is Education and Training, with 23 articles entailing 6.7% of total publications, followed by Higher Education Skills and Work Based Learning (16, 4.7%), Studies in Higher Education (14, 4.1%), and Higher Education (13, 3.8%). Not only did these two journals have the most citations, education and training, and higher education skills and work-based learning, with a total of 769 number of citations, but one significant article had the most cited one (217 citations) and was published in 2010. Only three of the top 10 journals have published less than 20 articles. As reported by CiteScore 2020, two journals have CiteScore greater than 6. Journals of the highest and lowest CiteScore covered by Studies in Higher Education (6.6), and Higher Education Skills and Work Based Learning (1.7), respectively. Although the Journal of Studies in Higher Education was ranked third in Scopus with 14 articles, the total number of citations profoundly to be higher than the other top rank journals.

Despite the Journal of Education and Training had the highest total citation rank, it was found that until the year 2020, the Journal of Higher Education Research and Development had the most cited article and the highest times citation (464). The most cited article was published by Taylor and Francis and was titled "The graduate attributes we have overlooked: Enhancing graduate employability through career management skills". Most previous scholars have stated that the ability to effectively manage a career among graduates is considered as one of the highly requested skills and also the most demanding quality in the current professional world [44]–[46]. It was proven that career management skills are prominently significant as proactive behaviors among graduates to improve their employability as preparation to enter the labor market [11], [47]. This indicates the growing interest of scholars and policymakers in graduate employability as a result of the mismatch in demand between employers and graduates to fit in the organization and ability to sustain in long-term employment [48]–[50].

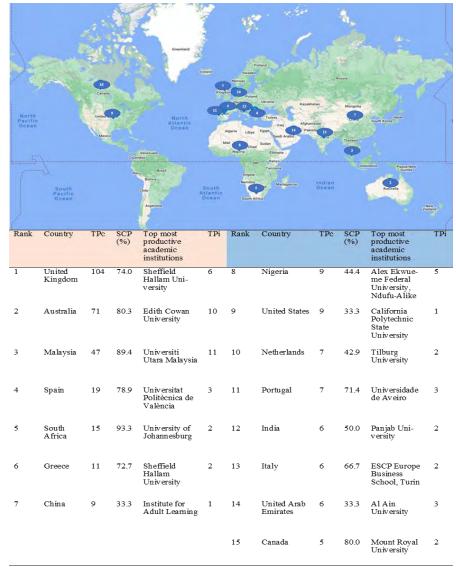Table 1. Top 10 most cited papers in graduate employability publications

Journal	TP	TC	CiteScore 2020	The most cited article	Times cited (Total ->2021)	Publisher
Education and Training	23 (6.7%)	687	3.8	Connecting enterprise and graduate employability: Challenges to the higher education culture and curriculum?	185	Emerald
Higher Education Skills and Work Based Learning	16 (4.7%)	82	1.7	Employability skills development: Strategy, evaluation and impact	32	Emerald
Studies in Higher Education	14 (4.1%)	787	6.7	Enhancing graduate employability: Best intentions and mixed outcomes	263	Taylor & Francis
Higher Education	13 (3.8%)	558	6.3	International experience and graduate employability: Stakeholder perceptions on the connection	172	Springer Nature
Higher Education Research and Development	10 (3.0%)	553	4.5	The graduate attributes we have overlooked: Enhancing graduate employability through career management skills	464	Taylor & Francis
Industry and Higher Education	9 (2.6%)	80	1.9	Graduates' employability: What do graduates and employers think?	29	SAGE
Journal of Education and Work	9 (2.6%)	434	2.3	Graduate employability and student attributes and orientations to the labor market	175	Taylor & Francis
Journal of Teaching and Learning for Graduate Employability	8 (2.3%)	14	1.4	Integrating career development learning into curriculum: Collaboration with the careers service for the employability	6	Deakin University
International Journal of Work-Integrated Learning	5 (1.5%)	19	2.8	Research-informed curriculum and advancing innovative practices in work-integrated learning	10	International Journal of Work-Integrated Learning
Journal of Higher Education Policy and Management	5 (1.5%)	15	2.7	Strategic institutional approaches to graduate employability: navigating meanings, measurements and what really matters	9	Taylor & Francis

Notes: TP: Total publications; TC: Total citations

3.3. Top countries and distribution of institutions on GE study

Figure 4 shows the top 15 most productive countries and institutions contributing to the global expansion of graduate employability research. These four nations (the United Kingdom, Australia, Malaysia and Spain) account for around 61.3% of global publications with a total of 241 papers and are frequently cited as major contributors to graduate employability publications. Sheffield-Hallam University in the United Kingdom came in first place with 104 publications. The following ranking was led by Edith Cowan University, Australia with 71 publications, followed by other institutions as illustrated in Figure 4.

Figure 5 displays a bibliometric map created based on co-authorship with network visualization mode. Australia, Malaysia, and South Africa were three of the 15 countries that have at least 80% of the SCP. This demonstrates that these countries benefit from the most robust intra-country collaboration. Meanwhile, the United States, United Arab Emirates and China had the minimum visualization of collaboration with SCP at 33.3%, with only two of the organization's six publications linked. Global research collaborations are primarily one of the factors that contribute to research's increased citation impact and credibility [51]. However, it was discovered that none of those academic institutions fell below the top 100 best universities in the world, as determined by the QS World University Rankings 2020. Despite the fact that graduate employability has garnered considerable attention from researchers, it was discovered to be scarce at the world's top-ranking universities. The remaining geographical distribution of publications are further explained as illustrated in Figure 4.

Rank	Country	TPc	SCP (%)	Top most productive academic institutions	TPi	Rank	Country	TPc	SCP (%)	Top most productive academic institutions	TPi
1	United Kingdom	104	74.0	Sheffield Hallam University	6	8	Nigeria	9	44.4	Alex Ekwue-me Federal University, Ndufu-Alike	5
2	Australia	71	80.3	Edith Cowan University	10	9	United States	9	33.3	California Polytechnic State University	1
3	Malaysia	47	89.4	Universiti Utara Malaysia	11	10	Netherlands	7	42.9	Tilburg University	2
4	Spain	19	78.9	Universitat Politècnica de València	3	11	Portugal	7	71.4	Universidade de Aveiro	3
5	South Africa	15	93.3	University of Johannesburg	2	12	India	6	50.0	Panjab University	2
6	Greece	11	72.7	Sheffield Hallam University	2	13	Italy	6	66.7	ESCP Europe Business School, Turin	2
7	China	9	33.3	Institute for Adult Learning	1	14	United Arab Emirates	6	33.3	Al Ain University	3
						15	Canada	5	80.0	Mount Royal University	2

Notes: TPc: total publications of a country; TPi: total publications of an academic institution

Figure 4. Top 15 distribution of countries and institutions with GE publications
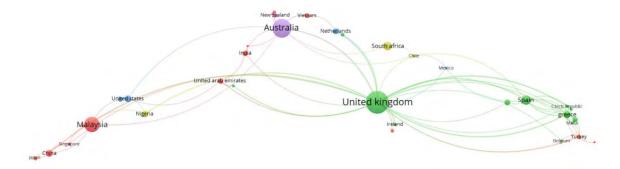
Figure 5. Bibliometric map created based on co-authorship with network visualization mode

3.4. Prolific authors

Table 2 lists the 10 most prolific authors in graduate employability research, with affiliations to four countries as in: Australia (four authors), Nigeria (three authors), UK (two authors), Finland (one author). The majority of authors were ideally to have a nearly equal number of publications. The Australian authors, Jackson, Denise, topped the list with a record of 59 publications since 2009, a 23 h-index, and 1,465 times citations. Tomlinson, Michael from the United Kingdom is the second highest ranking author with the most published research articles, with 52 publications, while the rest are on average. The prevalence and degree of research collaboration between universities were discovered in Australia and Nigeria. Meanwhile, the third, fifth, and tenth authors were respectively affiliated with the Alex-Ekwueme Federal University, Ndufu-Alike.

Table 2. List of the 10 most prolific authors

	Author	Scopus ID	Year of 1st publication	Total publication	h-index	Total citation	Current affiliation	Country
1	Jackson, Denise	37053893700	2009	59	23	1465	Edith Cowan University	Australia
2	Bridgstock, Ruth	6508046104	2010	32	14	1142	Griffith University	Australia
3	Okolie, Ugochukwu Chinonso	57195417537	2017	22	4	67	Alex Ekwueme Federal University	Nigeria
4	Tomlinson, Michael	35876837700	1980	52	14	1174	Faculty of Social Sciences	United Kingdom
5	Binuomote, Michael Olayinka	57214220416	2020	8	2	12	Alex Ekwueme Federal University	Nigeria
6	Rayner, Gerry M.	55657570100	2012	21	4	98	Monash University	Australia
7	Cai, Yuzhuo	36442274600	2004	34	9	326	Tampere University	Finland
8	Igwe, Paul Agu	57201619466	2015	31	6	113	Lincoln International Business School	United Kingdom
9	Kinash, Shelley	36023802700	2008	24	8	272	University of Southern Queensland	Australia
10	Nwajiuba, Chinyere Augusta	7801367933	2007	25	4	44	Alex Ekwueme Federal University	Nigeria

3.5. Author keyword analysis

A list of keywords from GE-related publications that appeared in a different time period. A total of (n=29) keywords were recorded from 1986 to 2020. However, from 1986 to 2000, there were an insufficient number of keywords that were not detected by the VOSviewer. Meanwhile, as illustrated in Figure 6, there has been a slight increase in keyword detection starting from the year 2000 onwards, with the keywords focusing on "higher education", "employability", "employment", and "graduates". Then, of the 866 keywords, as many as 26 number of keywords with highest total link strength found from 2011 to 2020, with the keywords "higher education" and "employability" showing a trend of concentration during that time period which can be seen in Figure 7.
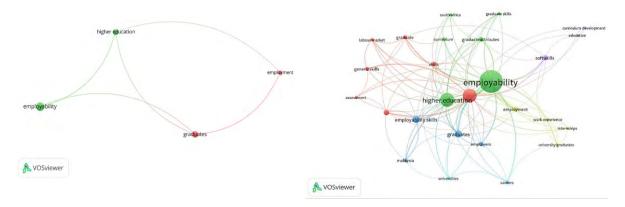
Figure 6. Bibliometric map on keywords co-occurrence network of GE-related publications from period 2000-2010

Figure 7. Bibliometric map on keywords co-occurrence network of GE-related publications from period 2011-2020

4. CONCLUSION

This bibliometric study analyzed worldwide trends in graduate employability research from 1986 to 2000. Three sub-periods indicate how patterns in graduate employability publications have grown over time. To begin, the slowest trend in graduate employability publications happened between 1986 and 2000. Between 2001 and 2010, the number of publications on graduate employability grew dramatically, and the trend maintained into the current sub-period (2011-2020). Education and Training, Higher Education Skills and Work-Based Learning, and Studies in Higher Education are the three most prolific publications for graduate employability research. The majority of active publications originate in the United Kingdom, Australia, and Malaysia. This study is limited to the Scopus database. Future scholars may do more research using the WOS or Google Scholar databases to get a more comprehensive view of the state of the art and emerging trends in GE-related issues.

ACKNOWLEDGEMENTS

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