A Bibliometric Review of Career Education from Contemporary Literature with *Vosviewer* and *Biblioshiny*

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Abstract

In recent years, career education has been an important topic for research due to its impact on student's personal development, especially on their decision-making and future employability. The need for present education systems to revamp themselves to suit the needs at different levels from adult education, higher education, schools, and various fields of research. However, there is much to be described in the body of knowledge from the perspective of bibliometric analysis. This article examines the term ‘career education from the Web of Science (WoS) database between the years 2018 and 2021. The bibliometric analysis results have indicated the trends of career education as data is scooped up from the Web of Science database. In terms of selective content analysis on highly cited articles, this section will discuss the trends of career education in higher education, in schools, in adult education, and the impact of the Covid-19 pandemic. There will also be some discussions on limitations and challenges in career education and some future suggestions for research.

Keywords: bibliometric analysis with vosviewer, career education, trends of career education, content analysis on career education, bibliometric analysis with biblioshiny

1. Introduction

Career education is concerned with the development of knowledge, skills, and attitudes through a planned program of learning experiences in educational and training settings that will help students make informed decisions about their life, study, and/or work options and enable effective participation in the workforce (Lee et. al., 2021). It is important as an approach to help students stay informed, and relevant and improve their life options. Students need to consider career education as equivalent to lifelong learning in the present market conditions (termed VUCA). In 2016, a report by Gallup International indicated that 80% of most US college graduates benefited from career education. Career-focused education programs in the United States have been centered around workplace readiness, and project-based learning is often used as an approach to improve core areas of 21st-century skills such as communication, collaboration, creativity, and critical thinking (Rocha et. al., 2022).

What do students expect from career education? Most education systems around the world understand the positive impacts of establishing career education because it supports personal development (Afanasiev et. al., 2018), economy, and social integration (Mahat et al., 2022). This is because every component is interrelated and builds on the inner development of the student, unification between multiple disciplines and subjects, and subsequently develops a creative and independent personality of the student. In addition, today’s generation of students perceives a career as a process of life realization, and personal development (Suditu, 2018). Traditionally, formal education pathways are still considered as means to a better strategy to obtain ad successful career according to their passion, and interests (Hitka et al. 2021). They understood the importance of staying engaged in a job and functioning in a positive working environment where they can be supported to excel. In addition, they are constantly seeking an opportunity that will propel them to become successful in their career, and even as entrepreneurs (Cadenas et. al., 2020).

However, there have been gaps that hinder the progress of career education in certain countries such as equity and access to their students (Bohn & McConville, 2019). Some higher education systems are also facing challenges to address the need for a more integrated approach so that they can have a more contextual and sensitive roadmap for career success (Ingusci, 2019). Scholars have highlighted that contextual factors play a part when career guidance services from western societies could not fit in non-western societies, and that economical, educational and sociocultural factors are drivers of promoting career education among youths (Viola & Daniel, 2019). This article examines the term 'career education from the Web of Science (WoS) database, mainly because little is known about the direction of career education in the last five years. A few questions propel as reasons for the study; What is the trend in career education considering the different fields and publications on the Web of Science? Is career education heading in a direction where it has ventured into other fields other than education? What are the studies that showed concerted efforts to integrate it into the process of education, and in the spectrum of primary, secondary rights, tertiary education, and continuing professional adult education?

Although numerous findings have been reported on the positive impact of career education, very few analyses are carried out through bibliometric analysis in the web of science database. For example, most empirical research has shown that career education can impact the career development of community college students, mainly in aspects of career planning, self-efficacy, and career maturity (Gragnano et. al., 2020). Additionally, it is interesting to know that other studies have found that integrating career education could enhance the education process such as motivating students toward their studies, balancing the link between life and studies (Bargmann, 2022), closing the gap between theory and practice (Duran et. al., 2022), and smoothen the process of unifying between educational content and coherence (Cho & Li, 2021). As far as career education is concerned, there is a lack of exploration and collective view in the body of knowledge. Even if there are efforts done through systematic literature reviews, it does not tell how these studies are related to other fields of study, or how are studies connected through a global network of universities, types of publications, and trends of authors' keywords.

1.1 Importance of the Problem

This article will examine the body of knowledge regarding the topic of career education mainly for two reasons. First, the author considers this exploration to be multidisciplinary and not just confined to the field of education (Bridgstock, 2019). Secondly, this study would also show how different fields are describing this subject so that there are stories to tell on its polarization, direction, and prediction of future trends (Balin & Mbodj, 2022). Hence bibliometric analysis usually serves its purpose for scholastic researchers, scholars, career counselors, and educationists to grasp recent literature regarding this topic so that they can stay informed about the marketplace, and how they can also prepare for guiding future careers and students to discover and look into the polarization and potential of future careers (Buford, 2022). As mentioned earlier, there is always a need to have a cross-time analysis because there had been so many changes in the VUCA environment that are much related to situations like COVID-19, social gaps between the rich and the poor, pressing market turmoil, and political unrest in different parts of the world.

1.2 Relevant Scholarship

Career education is usually offered by experienced professionals, groups, or organizations to assist people with coping with career choices, determining appropriate skills and education, exploring workplace culture, and taking action to achieve their career goals. For practitioners, career counselors can help people explore personal values to identify a satisfying work environment. As such, they can help individuals make decisions about their careers or profession. Individual counseling sessions may be used as part of an in-depth career exploration process (Moore et. al., 2021). In essence, they can also help individuals explore possible career paths, evaluate the match between personal values and prospective occupations, and explore their interests and motivations. Career counselors are a valuable resource for guidance in creating a career change plan. In terms of purpose, career counselors can also help people who are preparing to enter the job market by guiding resume preparation, interview skills, networking strategies, negotiation strategies, and salary negotiation (Duran et. al., 2022).

To relate between the practitioner and education, a career counselor is trained through its content, process, and context to provide individualized counseling for any range of groups, be it from youths to even adults. Qualified professionals who are familiar with a wide array of career challenges including entry-level positions, obtaining an academic degree or certification, overcoming personal challenges and challenges in the workplace, career decision-making, interviewing for jobs, job search strategies, personal development issues, and career maintenance (Hahn et.al., 2021). Technically, career counselors prepare individuals for success throughout their working lives by offering guidance on developing skills to achieve their career goals (Boat, 2022).

In addition to counseling sessions, career education professionals can provide individualized resources such as increased learning opportunities--including work-based learning experiences; training seminars; coaching; and workshops. Individual counseling may be performed through face-to-face sessions over the telephone or via e-mail (Shi et. al., 2022). There are a variety of resources for career counselors to use in providing services including educational institutions, community workshops, professional conferences and workshops, self-development books and tapes, vocational clubs and organizations, state government vocational rehabilitation programs, and support groups (Park, 2022).

2. Method

As this study is conducted through a bibliometric analysis research design, the approach is inductive rather than deductive approach. Hence there is no hypothesis but rather, data is rooted in the identification of patterns and intensity of the links between keywords, keywords plus, author trends, and emerging themes and concepts.

In terms of methodology, this article will utilize the bibliometric analysis of the trends of co-authorship, country production, keywords, and keywords plus from the WoS so that readers could comprehend the subject of career education in the WoS in the last 5 years (2018-2022). The word 'career education' was keyed into the Web of Science browser and resulted in 707 results. The selection criteria were based on a search of Table 1.

Table 1. Selection Criteria for Bibliometric Analysis in *Vosviewer* and *Biblioshiny*

Criteria	Selection
Countries	USA, Australia, England, Japan, China, Malaysia, Singapore, Indonesia, Thailand, Vietnam, South Korea, Germany, Canada, and India
Document types	Articles, Early Access, and Review Articles
Access type	Open Access

As mentioned earlier, this cross-sectional study on this body of knowledge is hypothesized to provide insights into the concentration areas of research so that there is an indication for past to present directions of research. Using the bibliometric analysis software of Vosviewer and Biblioshiny, both keywords and keywords plus are used as units of analysis to describe amongst others, the extent of coverage across fields of study, countries, and co-authorship links. As such the primary question is listed as follows:

What is the trend of career education considering the articles published on the Web of Science between 2018 and 2021?

To address this question, the bibliometrics analysis method is used because it focuses on the quantification of data science using quantitative analysis in knowledge databases. To aid the researcher, the Biblioshiny and Vosviewer software are used as a tool to analyze and present the links and impacts of publications within a given area of research across regions and universities. Thereafter, there will be discussions on core themes and suggestions so that this provides foundations for future studies for those interested to pursue this subject.

3. Results

The following figures in this section consist of the result of analysis from the two bibliometric software. Most of them are self-explanatory, and they technically portray the trends and network of information from the Web of Science. According to Figure 1, the annual scientific production for the keyword 'career education in the Web of Science Database has increased from 2018 to the top in the year 2019 but declined a little towards 2021-22. Annual scientific production refers to the total articles that are published in the selected year range of 2018 to 2022.

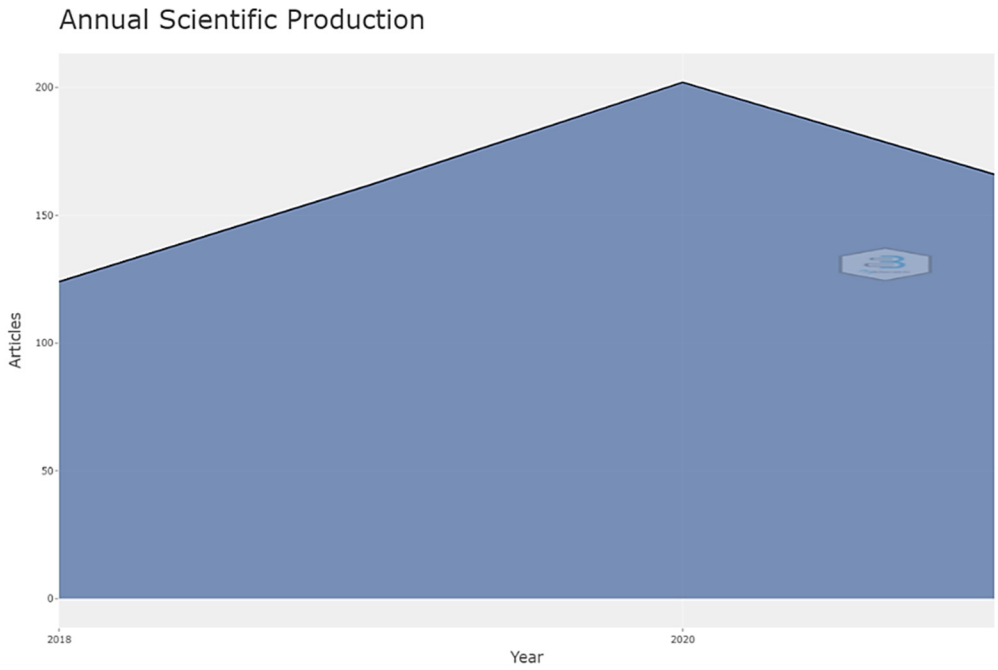

Figure 1. Annual Scientific Production for the Term 'Career Education' in the Web of Science Database

Following the explanation above, Figure 2 shows the relative comparisons in scientific production across countries. Based on the tones of colors, it is apparent that countries like the United States of America, the United Kingdom, Canada, Australia, China, and India are in the top tiers in the production of a knowledge base in career education. The figure also meant that the body of knowledge in Career education is trending across the world with varying degrees of empirical findings. The darker the tone, the more publications originate from the region or country.

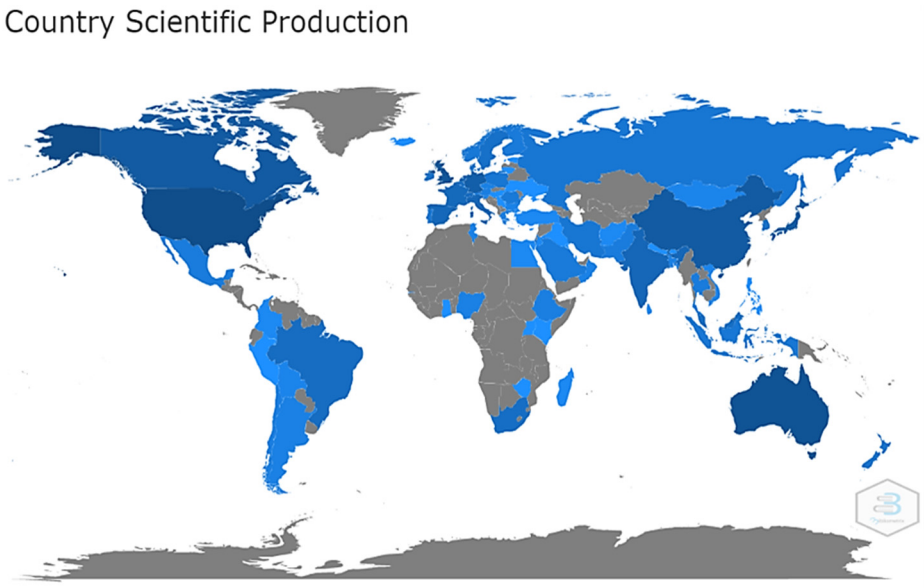

Figure 2. World Map Showing the country's Scientific Production in Career Education

The term 'simple country publications', or SCP refers to the number of co-authorship publications that originated from a single country, while the term 'multiple country publications', or MCP refers to the publications that resulted from international co-authorship. Therefore, Figure 3 added the bibliometric evidence by simple country publications (SCP) and multiple country publications (MCP). The top five countries in terms of SCP and MCP are the USA,

Australia, the United Kingdom, Japan, and China.

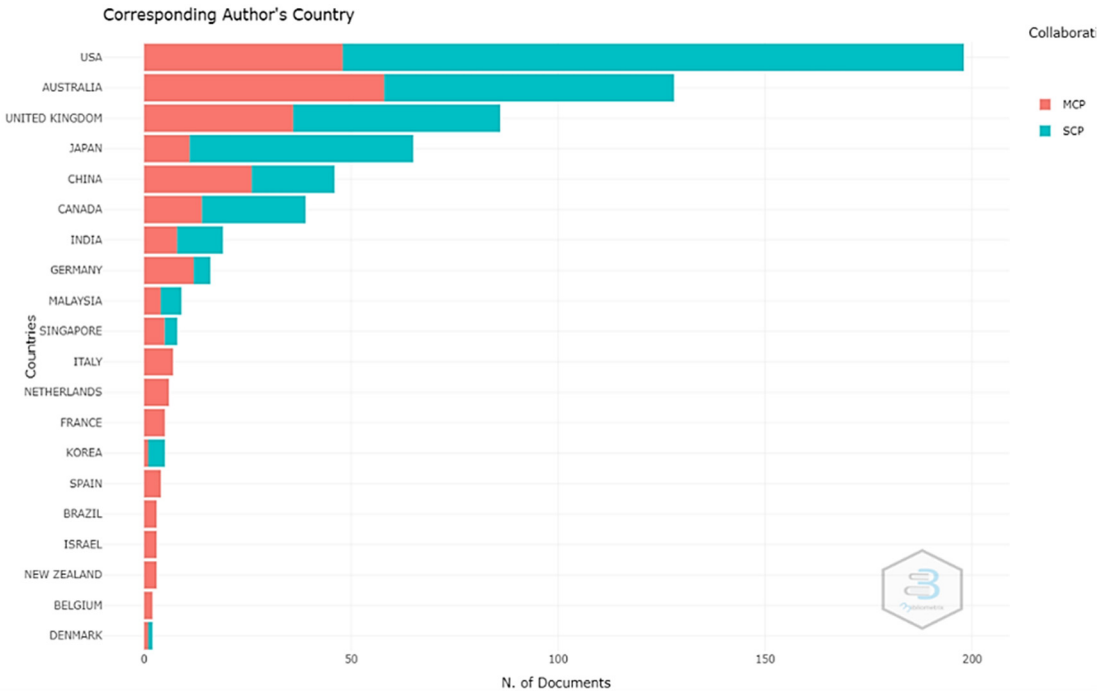

Figure 3. Corresponding Author'S Country for Simple Country Publications (SCP) and Multiple Country Publications (MCP)

Citation is referring to a quotation from or reference to a book, paper, or author, especially in a scholarly work. When concerning citations related to career education, it is apparent that Australia is leading ahead of the USA, China, and United Kingdom. The rest of the countries are closely treading behind, but they stayed below the 500-citation mark as compared to the top-tiered cited countries (Above 900 citation mark).

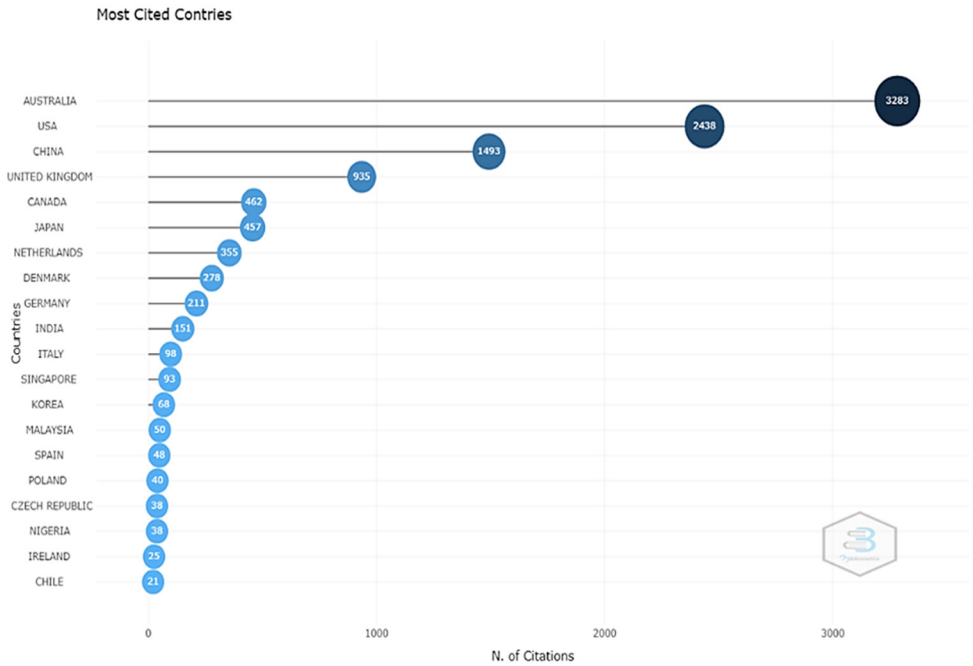

Figure 4. Most Cited Countries in terms of Career Education

Most often, citations are also compared in terms of the affiliated institutions that published the subject of career education. As such, Figure 5 is a continuation that shows the relevant institutions that are highly cited in aspects of career education. The University of Melbourne and the University of Sydney are actively producing knowledge bases in this field, and this is followed by Harvard Medical School and Duke University in the USA.

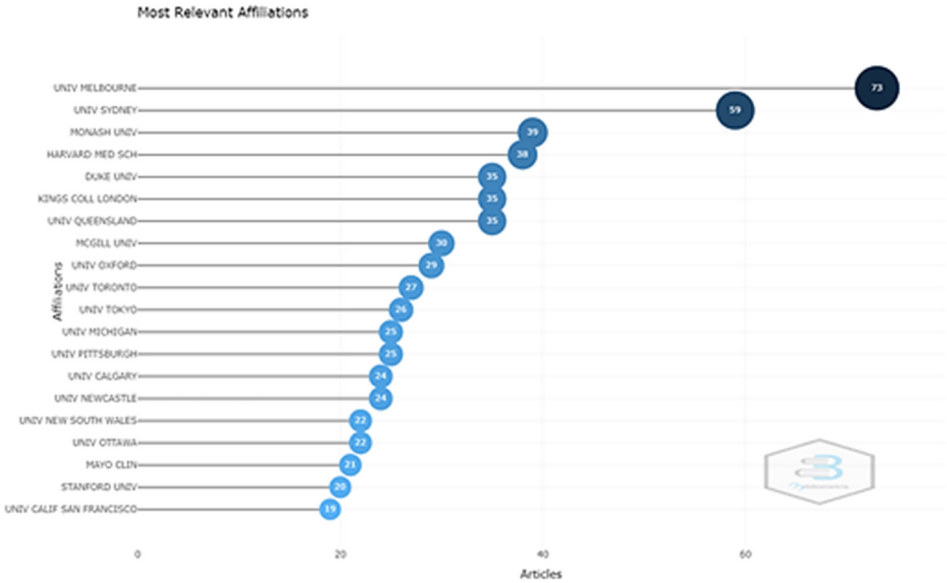

Figure 5. Most Relevant Affiliations in terms of Career Education

This bibliometric analysis is further validated with *Vosviewer* software to show the number of citations among countries. According to Figure 6, the larger the node means the more citations from each respective country. Also, each color represents a cluster or field that commonly discuss in the subject of career education. These clusters are auto-generated through the artificial intelligence function of this software. With each cluster, the distance between nodes also means that the likelihood of co-citations is higher coming from the countries.

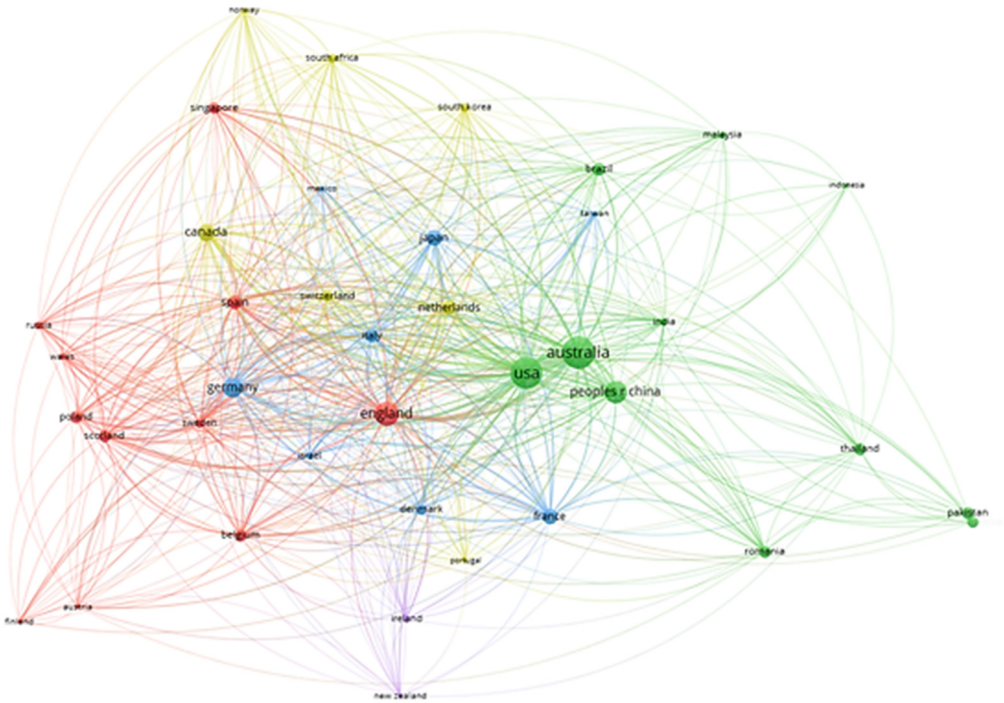

Figure 6. Relative Comparisons in the number of Citations for Career Education from Each Respective Country

The next analysis aims to compare the trends of keywords through the years since 2018. Figure 7 shows the cumulative keywords related to career education. As shown, most publications have concentrated on systematic literature reviews, followed by education and subsequently medical education. The rest of the keywords look unrelated to career education but are somehow indexed as authors' choices in the Web of Science database.

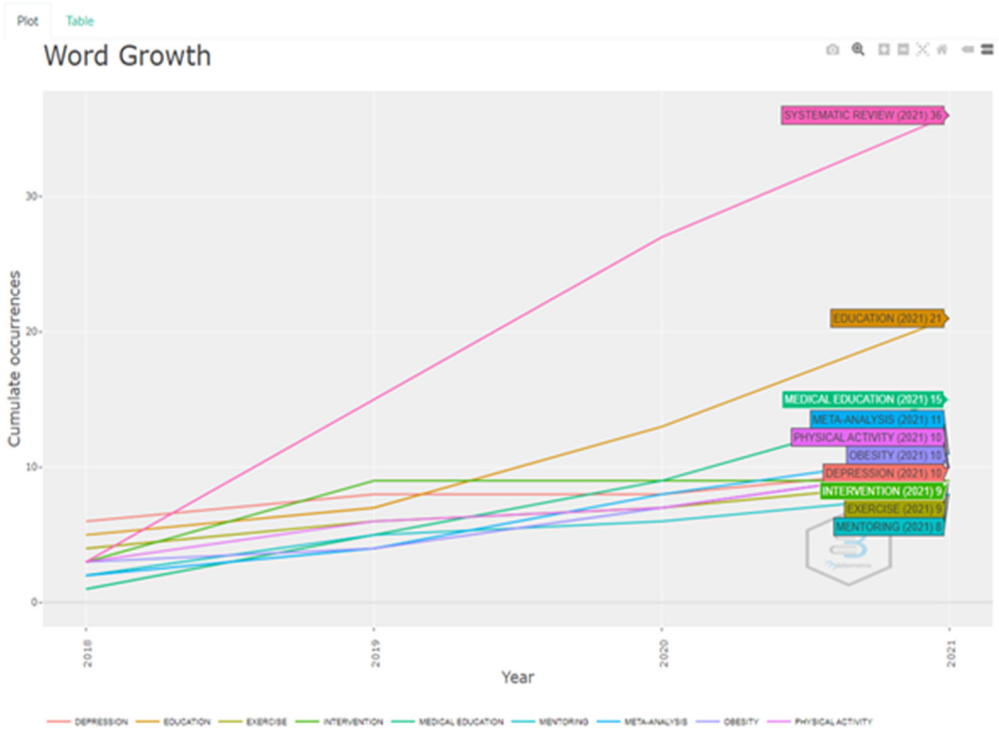

Figure 7. Analysis of Keywords in terms of Cumulative Word Growth among the Selected Articles

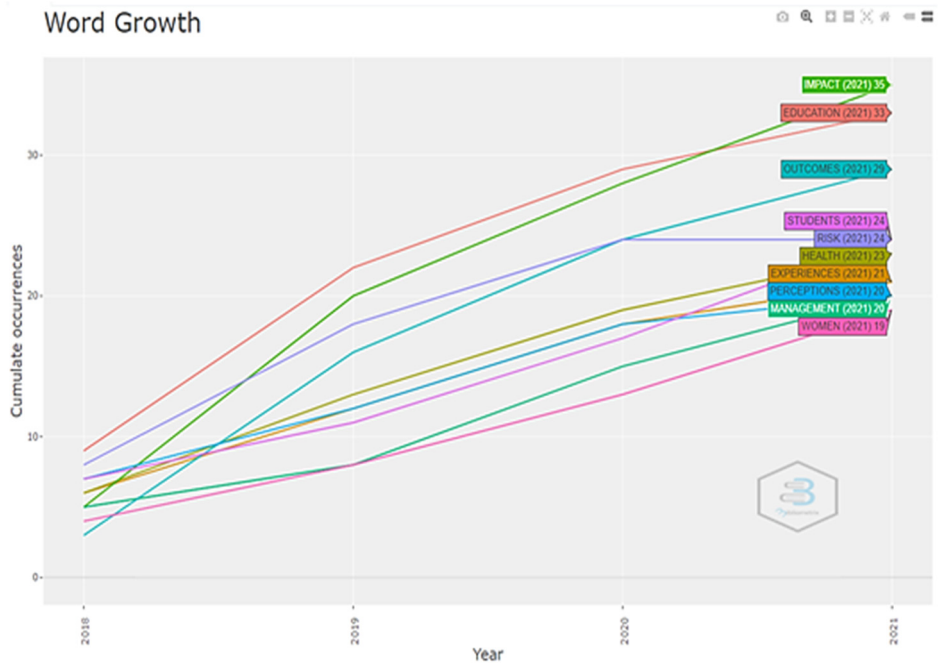

Figure 8. Analysis of Keyword Plus in terms of Cumulative Word Growth among the Selected Articles

The Figure 8 indicates the cumulative counts based on KeyWords Plus®. These are referred to as index terms, and it is automatically generated from the titles of cited articles. The descriptive nature of KeyWords Plus terms is that they must appear more than once in the bibliography and are organized from multi-word phrases to single terms. As such, KeyWords Plus complements traditional keyword or title retrieval in bibliometric analysis. Compare with the previous figure, the uptrends in career education appear to emphasize impact, followed by education, outcomes, and students. In general, most of the keyword-plus analyses do not differ much compared to the use of authors' keywords.

The following bibliometric analysis shall also consider which journals tend to publish more on the subject of career education. In terms of the sources, the BMJ Open journal is the leader in the publication of career education. This is followed by PLOS ONE, International Journal of Molecular Sciences, Frontiers in Psychology, and International Journal of Environmental, Research, and Public Health.

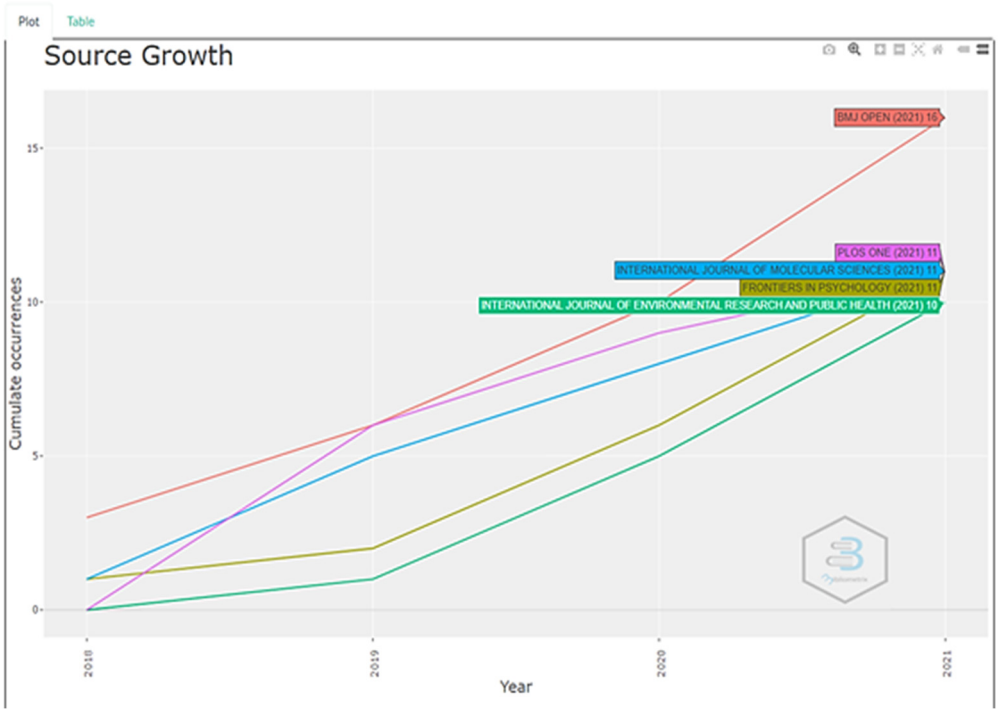

Figure 9. Source of Journals That Publishes on Career Education

For the next section, this bibliometric analysis will describe the information derived from the co-occurrence of keywords. This implies how the keywords are closely connected and clustered together in the database. With the assistance of Vosviewer, the minimum number of occurrences of a keyword is set as 10 with the use of full counting. Hence, a total of 65 keywords were analyzed and presented in a network view. it is found that keywords are clustered into four groups (with four different colors) as shown in Figure 10. The subsequent Figure 11 is an alternative and clearer representation of keywords that are clustered according to their themes by *Vosviewer.* Technically, the larger the nodes, the denser the publications. The distance between the nodes also shows how closely the publications are cited across fields of study.

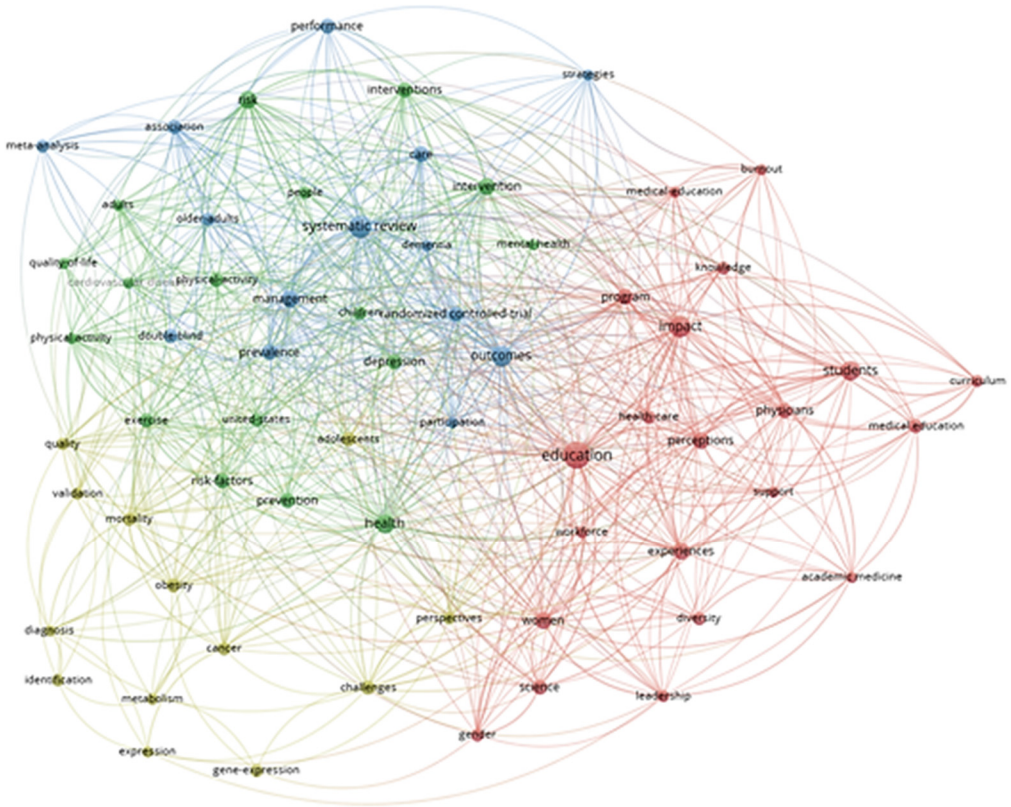

Figure 10. Links and Networks Resulting from Bibliometric Analysis of Career Education

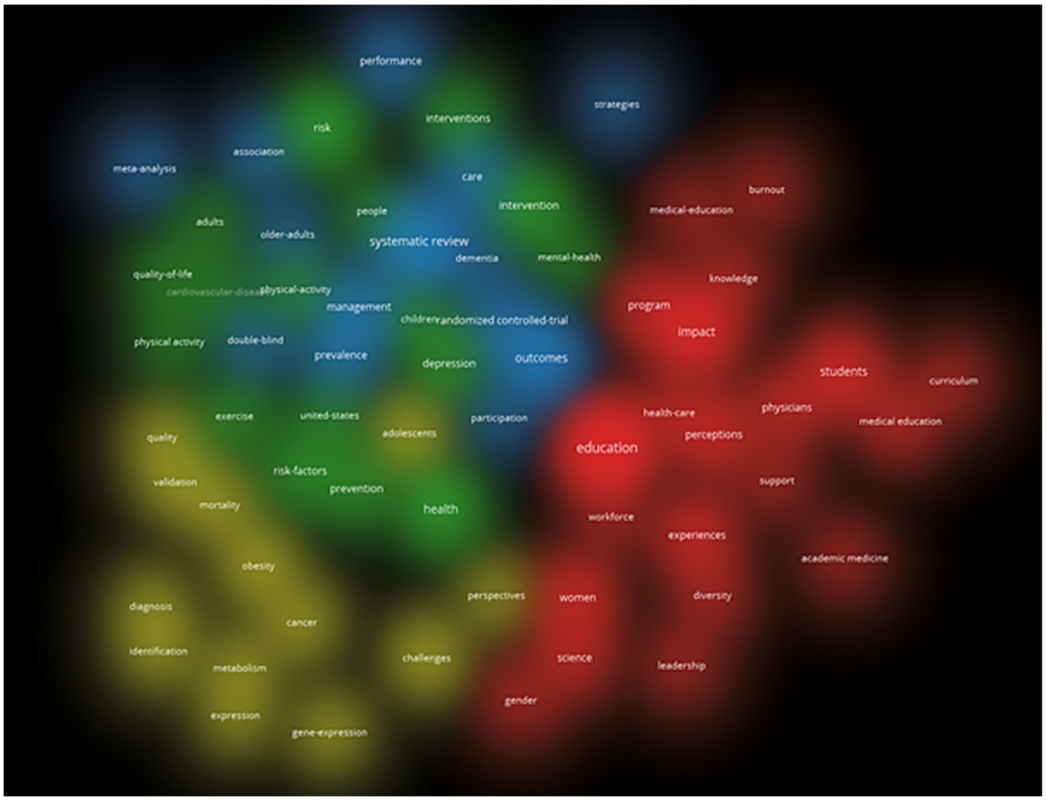

Figure 11. Clusters of Keywords Resulting from Bibliometric Analysis of Career Education

Alternatively, Figure 12 shows the density of keywords, the density of the keywords as represented in yellow. Career education is highly researched in aspects of education, impact, systematic review, outcomes, students, and management.

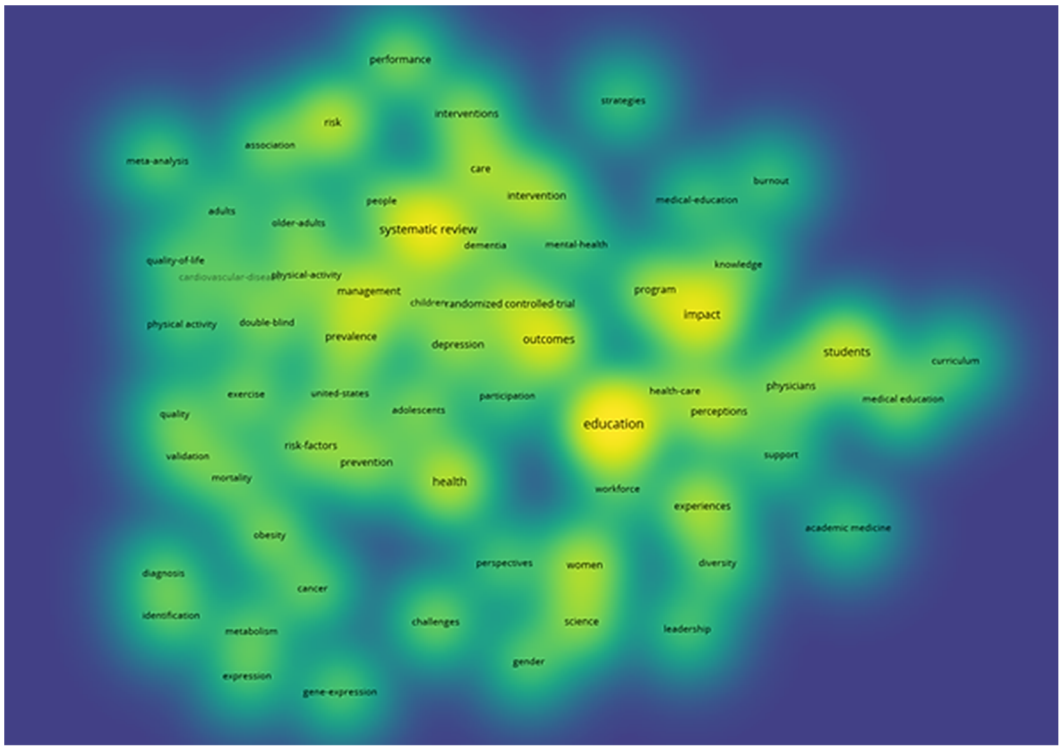

Figure 12. The Density of Visualization of Keywords from Bibliometric Analysis on Career Education

From another perspective, Figure 13 shows the density visualization based on total link strengths for the Keyword Plus.

Figure 13. Density Visualization Based on Total Link Strengths for the Keyword Plus

4. Discussion

The bibliometric analysis results have indicated the trends of career education as data is scooped up from the Web of Science database. In terms of selective content analysis, this section will highlight some of the content analyses from top-cited articles regarding trends in career education in higher education, schools, and adult education. Lastly, there will also be some discussions on limitations and challenges in career education and some future suggestions for research.

Since the breakout of the Covid-19 pandemic, there has been a further need for higher education to focus on employability traits, discover and personalize students' learning needs and address the complexities and demands of their future workplace. Using Nigeria as an example, studies have found that they have provided career training with mentoring (CTM) programs in their higher education and this program is useful for tertiary students to build future employability and sustainable career development. Their initiatives to provide quality career advice, coaching, and mentoring services while schooling, and foster career development and employability in their curriculum are aimed to facilitate students' career ambitions, career interests, personal development plans, and employability (Okolie et al., 2020). For higher education, career education includes the approach of coaching and mentoring. It must also consider a socio-environmental system as this would support the individual career development process. However, evidence of this relationship remains scarce (Barnes, Du Plessis, et al., 2021). On the other hand, career educators in higher education seek to constantly be engaged with industrial partners so that they could prepare students towards enhancing their decision-making skills and personality traits for the job (Bohn, 2019).

At the personal level, studies have found that different approaches to teaching could benefit students differently. For example, a study in Hong Kong indicated that students attending synchronous career courses during the COVID-19 pandemic had improved their identity formation. In other words, personality traits (such as identity formation stage, career adaptability, and emotional stability) have enhanced their personal development through career education (Lau et al., 2021). In South Korea, the government has increased the allocation and investments in career education in schools. A study was conducted on students' outcomes of career education and determining if career education in their schools could reduce the disparities in socio-economic aspects. They found that parental education level is positively associated with students' career development but is less likely to influence their career development competencies. In addition, students who are positively impacted by career development competencies are less influenced by their parental socio-economic status. This study implies that implementing a good school-based career education could narrow the gap in students' career development despite their parental socioeconomic backgrounds (Lee et al., 2021). A study in Latvia has also proven that the implementation of career education is carried out successfully by schools, firms, and municipalities. This results in improvements in the career choice of students, and there is a positive correlation between students' plans with the quality of career management portfolios (Smith et. al., 2018).

For adult education, career education will continue in the form of lifelong and continuing education. Unlike students, their challenges and strategies differ due to their circumstances, ability, and maturity in learning. For example, studies on factors contributing to continuing professional education in India have also indicated employees from the IT industry consider financial investment, duration, of course, employment opportunities, and quality of skills (Chen et al., 2018). Synonymous with continuing education, career education for adults has a positive impact on their career and professional development.

4.1 Limitations and Future Research for Career Education

Nevertheless, the trends and growth of career education do have their limitations and challenges. Other questions persist when concerning career education. For example, to what extent career education today is addressing the rising mismatch between employers' needs, the employment process, and the employees' needs? Human resource departments are increasingly becoming more strategic to hire people for their firms and these demands often change as their firms are constantly changing in the volatile, uncertain, (VUCA) environment (Cousins, 2018). Several institutions in the Zemgale Planning region have reported that while career education serves to help students identify and develop their skills, interests, and capabilities, there are problems in terms of implementation. This is exemplified in time management, and in the complexity of organizing multiple events that are non-interfering with schoolwork. From the student's perspective, they faced obstacles in terms of personal interest, lack of financial resources, and absence of career specialists in their schools (Morrow et.al., 2022). Another study from Australia has shown that there are a disparity between educational and career outcomes in rural, regional and remote students when compared to students from metropolitan areas (D'Angelo & Dollinger, 2021). This challenge calls for more engagement of parents/carers, peers, and local industry who are instrumental in promoting regional job trends and

pathways.

5. Conclusions

As a need to support student employability in the future, any staff involved in career education ought to support the development of students' social capital and personal adaptability (Helens-Hart, 2019). In achieving this initiative, career educators must also act to increase students' competitiveness, while at the same time instilling a sense of independence away from job guarantees and securities in the current job market conditions. The bibliometric findings from this study indicate that career education is trending in the body of knowledge, spanning across contexts and disciplines. This paper has also highlighted that developing their career education and professional competencies is about helping students to be efficacious in their choice of profession, and also addressing the career expectations in the marketplace. This key point is also validated by other studies showing that self-efficacy is a factor that contributes to one's career decisions (Arghode et al., 2021) and that it generates students' interest in achieving their career goals. As part of the strategy in career counseling, there must be an emphasis on providing resources and a myriad of tactics that will guide students to develop the knowledge, attitudes, and skills that are not just based on current market needs, but also the future. As a forethought, career educators need to be aware and attentive to the changing political, economic, and societal landscape, and education policymakers are returning to the drawing board to address the recent impact of Covid-19 on education. In a nutshell, career education should be viewed as a collaborative effort of all parties.

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