Career Maturity and Intervention Strategies:
A bibliometric approach

Aizuddin Ghazali[1,] Norfaezah Md Khalid[1],
Amira Najiha Yahya[1], Ingrid Harrington[2]

[1] Department of Educational Psychology and Counselling, Faculty of Education, University Malaya, Kuala Lumpur, Malaysia, [2] School of Education, University of New England, Armidale, New SouthWales, Australia

s2156687@siswa.um.edu.my, norfaezah@um.edu.my, amirayahya@um.edu.my; iharring@une.edu.au
Tel : 03-79673894

Abstract

This study explores whether Malaysian student career awareness interventions whilst still in secondary school, that focus on career maturity and their readiness for the evolving job market, effectively prepares them for employment success. Recognising the importance of aligning career choices with interests and skills, the paper examines the impact of these interventions. However, despite growing interest, there remains a gap in understanding the actual impact of these career interventions for Malaysian students transitioning out of secondary education. Using Scopus Analyzer, academic papers were analysed considering publication trends, authorship, citations, and key topics. The paper aimed to highlight research trends and patterns, identify research gaps, and offer insights for future studies. Ultimately, this research seeks to clarify whether the career awareness interventions prior to Malaysian students transitioning to the workforce genuinely enhance their career choice, maturity, and success.

Keywords: Career; intervention; career maturity; career choices

1.0 Introduction

In the ever-evolving landscape of education, the imperative to guide students toward fulfilling and meaningful careers has gained paramount significance over the past decade. Recognizing the pivotal role that the formative years of secondary education play in shaping the future trajectories of students, this research explores the dynamic interplay and impact between facilitating career awareness training modules and the level of career maturity among Malaysian school students. The transition from adolescence to adulthood is a critical juncture where students grapple with myriad choices regarding their educational and vocational paths. Amid this juncture, career modules have emerged as potential catalysts designed to equip students with the requisite knowledge, skills, and self-awareness to make informed decisions about their future career choices.

This research contributes to a comprehensive understanding of the effectiveness of career modules specifically tailored towards Form 4 students, as this demographic is recognised at the intersection of pivotal academic decision-making. By delving into the nuanced dimensions of their career maturity and understanding by encompassing cognitive, affective, and behavioral components, this study uncovers the intricate ways in which career modules may influence their holistic career development and understanding of career choices. Drawing on experience as an education counselor, the insights garnered from this research inform and enhance counseling practices, ensuring that interventions align with the evolving needs of Form 4 students on the cusp of shaping their vocational identities (Agungbudiprabowo et al., 2018; Suryadi et al., 2020).

Moreover, the academic underpinning of this study rests on a commitment to rigorous bibliometric analysis, providing a panoramic view of the existing scholarly landscape. This approach not only facilitates a nuanced comprehension of prevailing research trends, but also enables the identification of gaps and opportunities for future investigations. Consequently, the outcomes of this research contribute not only to the academic discourse of the career development of Malaysian students, but also to the enhancement of practical strategies employed by educators and counselors in nurturing their career maturity.

2.0 Literature Review

The effectiveness of career modules in enhancing career maturity among Malaysian secondary school students has been a subject of several research studies. Research by Wati et.al., (2021) reported a positive impact upon the career maturity for children with special needs in vocational high schools, after the implementation of a career guidance module to improve their career maturity. Another study by Noh et.al., (2023) investigated the impact of a growth mindset intervention on secondary school students' attitudes towards mathematics, highlighting the potential influence of interventions on career-related attitudes and academic performance. A study on the effectiveness of a career counseling model among drug addicts demonstrated a positive impact on the level of career maturity. These studies collectively suggest that targeted interventions, such as career guidance modules and counseling models, can positively and effectively contribute to the career

maturity of secondary school students. Furthermore, the influence of various factors on career planning and decision-making has been extensively explored. Research highlights the positive impact upon student communication skills, levels of motivation, and experience with career planning and decision-making, emphasizing the multifaceted nature of career development (Fahmi & Hapzi Ali, 2022). Additionally, the impact of school upon the career choice among secondary school students has been investigated, underscoring the significance of informed career guidance in educational settings. These findings provide valuable insights into the complex interplay of internal and external factors in shaping students' career trajectories, further underscoring the importance of targeted interventions and guidance programs.

Career maturity plays a pivotal role in guiding students toward informed and realistic career decisions, aligning their aspirations with personal attributes highlights the significance of career maturity in facilitating a smoother transition into the workforce, preventing the need for trial-and-error approaches in career planning. The multifaceted impact of career maturity extends beyond academic motivation. Notably, career maturity contributes to the development of career adaptability, fostering self-efficacy and adaptability crucial for navigating a dynamic job market and managing career transitions. Furthermore, students with higher career maturity are more likely to achieve employment success in their chosen fields, as they possess a clearer understanding of their strengths, interests, and the demands of the job market. This not only enhances their prospects for securing meaningful employment but also cultivates a commitment to lifelong learning, essential for success in today's rapidly evolving job market. Additionally, career maturity plays a role in personal development, equipping students with essential life skills, including self-awareness, self-management, and social skills, which extend beyond the workplace to positively impact their personal lives. Moreover, the broader societal impact of promoting career maturity, contending that schools, by fostering career maturity, contribute to the holistic development of students, preparing them for a successful transition to the workforce and fostering positive impacts on their communities.

It appears that interventions such as career guidance modules, counseling models, and growth mindset interventions can significantly influence the career maturity and decision-making of secondary school students. Moreover, the multifaceted nature of career development, influenced by factors such as communication skills, motivation, and school environment, underscores the need for comprehensive and tailored approaches to support students in their career planning and decision-making processes. By integrating these insights into educational practices, educators can contribute to the holistic development of students' career readiness and maturity.

3.0 Methodology

Bibliometrics involve the collection, organization, and evaluation of bibliographic data sourced from academic and scientific literature. It is used to measure research output, assess the impact of publications, and analyze trends within specific fields. (Alves et al.,

2021; Assyakur & Rosa, 2022; Debackere et al., 2002). In addition to basic descriptive statistics such as publication journals, years, and primary author categories, advanced techniques like document co-citation analysis are also employed. Conducting a comprehensive literature review is a cyclical process, involving the careful selection of relevant keywords, systematic searches of the literature, and thorough analysis. This approach ensures the development of a robust bibliography and generates reliable findings. Following this methodology, the study focused on high-impact publications, recognising their significance in providing insights into the theoretical frameworks driving the evolution of the research domain. To ensure data accuracy, the SCOPUS database was utilised, covering the period from 2020 to December 2023. This ensured the inclusion of peer-reviewed articles of high quality, while deliberately excluding books and lecture notes to maintain a focus on rigorously validated sources. This strategic choice reflects the study's aim to use bibliometric analysis to gain a comprehensive understanding of the scholarly landscape within the specified timeframe.

Data Search Strategy
The study implemented a screening process to identify search terms for article retrieval. The initial step involved querying the Scopus database using the online TITLE-ABS-KEY field with the expression ((career AND module OR career AND planning) AND (career AND maturity OR career AND choice) AND (students OR school*)) AND (LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2021) OR LIMIT-TO (PUBYEAR, 2022) OR LIMIT-TO (PUBYEAR, 2023)) AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "cp")) AND (LIMIT-TO (LANGUAGE, "English")), resulting in the compilation of 1547 articles. Subsequently, the query string was refined to focus on students as learners, specifically emphasizing the search terms "career module" OR "career planning." This adjustment yielded 849 initial results, which were then refined to include only research articles written in English, excluding article reviews. After refining the search string further, the final dataset comprised 644 articles for the bibliometric analysis. As of December 2023, all relevant articles from the Scopus database that focused on career maturity and career planning, specifically among students, were included in the study for a comprehensive analysis.

Data Analysis
Datasets containing details such as publication year, title, author names, journal, citations, and keywords in PlainText format were extracted from the Scopus database, covering the period from 2013 to December 2023. These datasets were then analysed using VOSviewer software (version 1.6.19), which facilitated both the analysis and visualisation of maps through VOS clustering and mapping techniques. VOSviewer offers an alternative to the Multidimensional Scaling (MDS) method, with a similar aim of positioning items in a low-dimensional space to represent their relationships and similarities effectively. This method

enables a clearer understanding of patterns and trends within the research domain. However, VOSviewer differs from MDS in its method of normalising co-occurrence frequencies. Rather than relying on traditional similarity measures like Jaccard indexes or cosine similarity, VOSviewer applies a more appropriate technique known as association strength (ASij). This technique measures the strength of the connection between two items (i and j) based on their co-occurrence frequency relative to their total occurrences. The association strength formula is typically expressed as:

$$ASij ¼ Cij$$
$$Wiwj$$

the index utilized is "proportional to the ratio between, on the one hand, the observed number of co-occurrences of i and j and, on the other hand, the expected number of co-occurrences of i and j under the assumption that co-occurrences of i and j are statistically independent". Using this index, VOSviewer arranges items on a map by minimizing the weighted sum of squared distances between pairs of items, which ensures that items with stronger associations are placed closer together. To further enhance the accuracy of this process, LinLog/modularity normalization is applied. This approach, combined with the software's visualisation capabilities, enables the identification of patterns based on mathematical relationships between the data.

Through the application of keyword co-occurrence, citation analysis, and co-citation analysis, VOSviewer reveals underlying connections and trends within the dataset. For example, keyword co-occurrence analysis allows researchers to track the development of specific research areas over time by examining how frequently certain keywords appear together, providing insights into emerging themes and shifting focuses in the field (Zhao, 2017) proving effective in identifying prevalent topics across diverse fields. In contrast, citation analysis helps identify key research issues, trends, and methodologies, while also exploring the historical importance of a discipline's main areas of focus (Allahverdiyev & Yucesoy, 2017). Document co-citation analysis, a frequently applied bibliometric relies on network theory to map data structures and identify relevant patterns within the network (Liu et al., 2015).

4.0 Results

What are the publication trends related to students' careers over time?
Figure 1 illustrates a consistent upward trajectory in publications exploring career maturity among Malaysian students from 2013 to 2023, indicating a growing interest in the academic exploration of this topic. This surge can be attributed to a confluence of factors such as the dynamic nature of the job market, a heightened emphasis on career development by universities and policymakers, and broader societal concerns regarding youth employment and career satisfaction. The evolving landscape of employment, marked by rapid

technological changes and shifting skill requirements, appears to be a driving force behind the increasing research focus on preparing students for future careers, as reported in research.
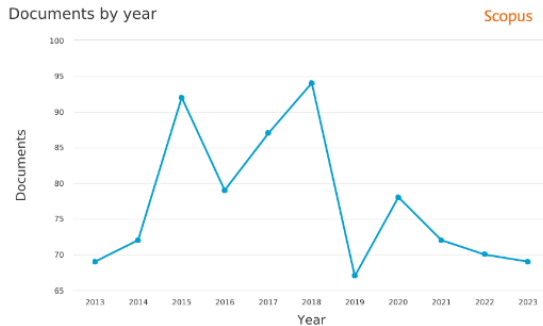

Figure 1 : Research trend for students career

Upon closer examination of the data, distinct periods emerge. The initial years (2013-2017) witness a steep rise, suggesting a surge in interest or the formalization of career maturity as a legitimate field of inquiry. This increase could be attributed to the growing recognition of career guidance as crucial for preparing students to meet the demands of an increasingly dynamic job market, as well as a rise in policy emphasis on youth employability. The subsequent plateau (2018-2021) hints at a phase of consolidation and deeper exploration of existing themes within the field. This may have occurred as researchers focused on refining career intervention frameworks and addressing gaps in existing methodologies. Notably, the global spotlight on the Fourth Industrial Revolution and the integration of soft skills into career preparation in 2019 could have shaped academic discourse during this time. The slight dip observed in the most recent years (2022-2023) raises questions about potential shifts in research focus or fluctuations in academic priorities. These trends pose intriguing questions for future bibliometric analysis. Investigating thematic shifts in research over time, identifying prevalent methodological approaches, and analyzing the geographical spread of studies are key pathways to gaining a more thorough understanding of the changing landscape of career maturity research among secondary students. As this field continues to progress, these explorations can reveal important insights into emerging trends, research gaps, and the evolution of educational and career guidance strategies tailored for this demographic. Figure 1 serves as a valuable foundation for the consideration of uncovering unanswered questions, and guiding future investigations into the dynamics of career development within academic settings.

What is the citation by document based on the analysis?

Figure 2 below presents a visual representation of a map featuring clusters of nodes (circles), each representing documents and connected by edges (lines) that signify citation relationships. The size of each node represents the number of citations a document has received, reflecting its impact or significance within the network. Likewise, the thickness of the edges connecting the nodes indicates the strength of citation links between documents, with thicker edges signifying stronger citation connections. This method of visualisation offers a clearer perspective on the most influential works in a field and illustrates how they are interconnected through citation patterns, providing valuable insights into key themes and seminal research within the academic domain. In terms of clusters and relationships, the central cluster comprises several large nodes, indicating highly cited documents that form the core of research on career maturity among students. Radiating outwards from the centre, smaller clusters potentially signify thematic subfields within the broader topic. Analyzing the keywords associated with these clusters could unveil specific research areas within the overarching theme of career maturity. The connections between nodes, represented by edges, showcase citation relationships, emphasizing significant connections and influences between different documents.
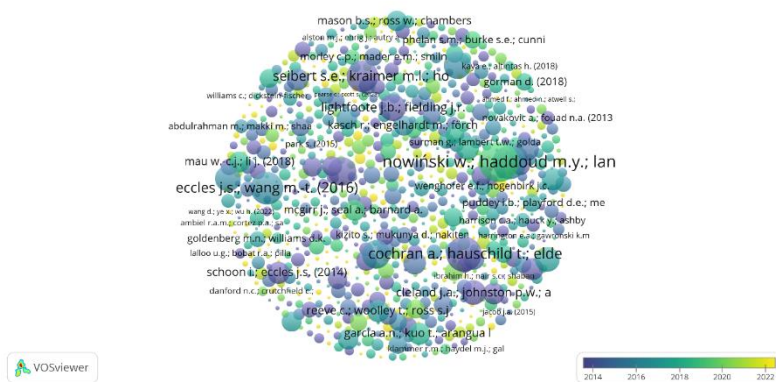

Figure 2: Network visualization map of citation by document

A closer examination of the direction and strength of these edges can identify key reference points and potentially reveal emerging research areas within the field. Additional elements in the figure include different colours assigned to nodes, which may convey supplementary information about the documents, such as publication year, author, or methodology. However, a definitive interpretation of the colour scheme requires knowledge of the specific settings used in the VOSviewer analysis. Some nodes are labelled, potentially with document titles or author names, however, due to the image resolution, not all labels are discernible. In summary, Figure 2 provides a valuable visualization of the citation network within research on career maturity among secondary students. It not only

highlights core documents and thematic subfields within the field, but also provides insights into the relationships and influences between different research contributions.

What are the most used keywords in the study?
Using VOSviewer with a minimum threshold of ten occurrences, the author keywords were analysed and have been represented below in Figure 3. Figure 3 provides a visual depiction of a map containing interconnected keyword clusters, conveying thematic relationships. The size of the nodes represents the frequency of keyword occurrences in the analysed articles, while the thickness of the lines between the nodes reflects the strength of connections between the related keywords. This allows for a clear visualisation of both the prominence of specific keywords and the degree of their interrelationship. The figure portrays the strength of associations among these keywords, with similar colours indicating common co-occurrences. For instance, the figure suggests a close relationship and frequent co-occurrence of keywords such as "career choice," "medical," "students," and "career and professional development" due to their similar colours.
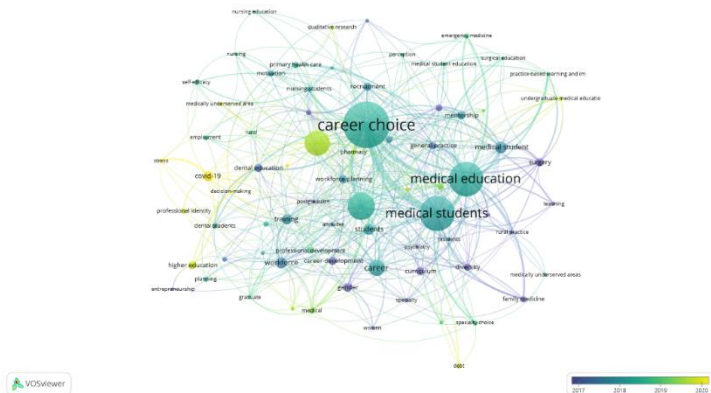

Figure 3: Keyword co-occurrence network visualisation map

Examining prominent clusters, the central cluster situated in the largest section appears linked to career choice and decision-making. Notable keywords such as "career development," "vocational choice," "career guidance," and "occupational choice" suggest the centrality of these concepts in research on career maturity among students. Moving to the left, a cluster focuses on personal qualities and psychological factors associated with career maturity, featuring keywords like "self-efficacy," "identity," "motivation," and "values," emphasizing the significance of individual characteristics in career development. On the right, a contextual cluster encompasses keywords such as "workforce preparation," "employability," "higher education," and "professional development," indicating research considerations regarding broader societal and educational frameworks influencing career

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maturity. Additionally, Figure 3 introduces elements such as varied colours of the nodes, which may signify information such as publication year or research methodology, although the specific settings in the VOSviewer analysis are necessary for a definitive interpretation. The grey overlay on the right side potentially indicates a specific search term or filter, the knowledge of which could provide additional context for the displayed keywords. Overall, this figure offers an insightful visual representation of the thematic landscape in research on career maturity among students, emphasizing the central roles of career choice, personal qualities, and contextual factors. However, a comprehensive understanding would require insight into the specific settings employed in the VOSviewer analysis.

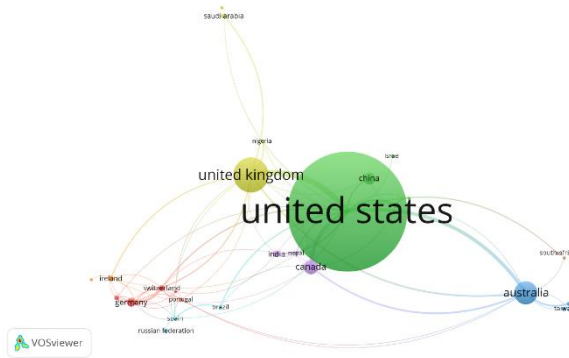*What are the collaborative relationships between countries in co-authorship?*

Figure 4: Co-authorship countries' collaboration

Figure 4 displays a map consisting of clusters of nodes, where each node represents a country, and the connecting edges signify co-authorship collaborations. The size of the nodes represents each country's total publication output in career maturity research among students, while the thickness of the edges signifies the strength of collaboration between countries. Notably, the most prominent clusters are dominated by English-speaking countries, including the United States, the United Kingdom, Canada, and Australia, which dominate the central cluster, indicating a high level of collaboration and influence within this research domain. This dominance suggests a robust collaboration within this group on research related to career maturity among students. Another distinct cluster on the left side of the map comprises European countries such as Spain, Germany, Portugal, and Switzerland, indicating active collaboration within the European region in the same research domain. Smaller clusters, including those featuring Asian countries like China, Japan, and South Korea, as well as Nordic countries including Sweden, Finland, and Denmark, are also discernible. These clusters signify ongoing collaborations in these regions, albeit to a lesser extent compared to the central and European clusters. Figure 4

also incorporates additional elements, such as different colours assigned to nodes, which may provide supplementary information about countries, possibly related to publication years or research focus. However, a definitive interpretation of the colour scheme is challenging without specific insights into the VOSviewer analysis settings. Some nodes are labelled with country names or abbreviations, though due to image resolution, these labels are not all clearly discernible. Overall, figure 4 captures a snapshot of the international collaboration landscape in the field of research on career maturity among students. It underscores the significant roles played by English-speaking and European countries, while also shedding light on collaborations in other regions like Asia and Scandinavia.

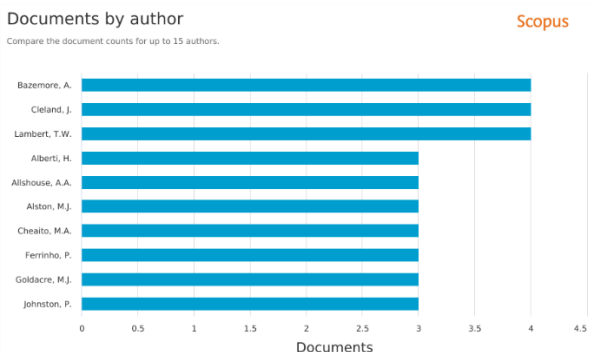*Who writes the most cited articles?*

Figure 5 : Documents by author

The figure generated by Scopus Analyzer illustrates the number of documents authored by various researchers in the field of career maturity among students, offering valuable insights into individual academic contributions. This visualisation allows for the identification of leading scholars in the field, their research output, and potential areas for collaboration, helping to map the landscape of academic influence and expertise within career maturity research. A detailed review of the top authors, including Bazemore, A., Cleland, J., and Lambert, T.W., who each authored four publications between the years 2013 and 2023 reveals key trends. Their consistent presence highlights their significant impact on career maturity research. This list reflects a diversity of researchers from various disciplines, such as Goldacre, M.J., a medical professional, and Ferrinho, P., an expert in health policy. Other authors, including Alberti, H. and Johnston, P., each with three publications, demonstrate a steady engagement in the field. The data also suggests potential for future collaboration, drawing on the diverse expertise of these scholars. Ultimately, the results provide a detailed view of the academic landscape, helping researchers and policymakers identify key contributors and trends.

5.0 Discussion

This study delves into the effectiveness of career interventions, specifically their impact on the levels of student career maturity. The bibliometric analysis using the Scopus Analyzer revealed a significant increase in academic interest in career maturity from 2013 to 2023, reflecting the dynamic job market and the growing emphasis on career development. However, a plateau and slight dip in recent years suggest shifts in research focus, most probably due to the rapid advancement of technology in career planning tools and the evolving nature of skills needed in the workforce. Additionally, the increasing importance of soft skills, remote work trends, and the influence of global economic challenges may have steered research towards more contemporary issues in career development. The analysis highlights key contributors and emerging themes, revealing a diverse, interdisciplinary field. This study underscores the need for future research to explore under-investigated areas and adapt to evolving career development needs.

5.1 Trend Analysis

The analysis revealed a significant upward trajectory in publications on career maturity from 2013 to 2023, indicating a growing academic interest likely driven by rapid technological advancements and changing job market demands. The plateau observed between 2018 and 2021 suggests a period of consolidation the global addressing the immediate challenges brought about by the COVID-19 pandemic, which shifted attention towards crisis management, remote work adaptations, and economic recovery, whilst the slight dip in recent years may indicate a shift in research focus or emerging new priorities as the world transitions into post-pandemic realities.

5.2 Keyword and Topic Analysis

Prominent keywords such as "career development," "vocational choice," and "career guidance" underscore the interdisciplinary nature of career maturity research. The analysis highlights robust collaborations among researchers globally, reflecting the universal relevance of career maturity. Specific attention is given to the role of personal qualities such as self-efficacy and motivation in career development.

5.3 Research Gaps and Future Directions:

Despite the growing body of research, gaps remain in understanding the long-term impact of career interventions. Future studies should focus on diverse populations and integrate new technologies into career interventions. Longitudinal studies are particularly needed to evaluate the sustained impact of career modules on career maturity. Moreover, research should explore the effectiveness of these interventions across different educational contexts and age groups to develop more tailored and inclusive approaches.

6.0 Conclusion

The Scopus Analyzer-generated figures depicting the trajectory of publications on career maturity among students provide important insights into the changing landscape of academic exploration in this field. The consistent upward trajectory from 2013 to 2021 indicates a growing interest in career maturity, likely influenced by dynamic job market conditions, heightened attention to career development by universities and policymakers, and broader societal concerns about youth employment and career satisfaction. The observed periods of steep rise, subsequent plateau, and a recent slight dip suggest phases of increased interest, consolidation, and potential shifts in research focus or academic priorities. Further exploration of potential thematic shifts, dominant methodologies, and geographical distribution over time could enhance our understanding of the dynamic nature of career maturity research.

The examination of top authors and their publication counts reveals distinct patterns within the academic landscape. Noteworthy contributors like Bazemore, Cleland, and Lambert, each with four publications, showcase a consistent and substantial impact on the discourse surrounding career maturity. Exploring their works could provide deeper insights into key themes and methodologies. The diverse authorship, ranging from medical professionals to health policy experts, emphasizes the interdisciplinary nature of career maturity studies. Authors with sustained productivity, such as Alberti, Allshouse, Alston, Cheaito, Goldacre, and Johnston, contribute significantly to the ongoing academic dialogue on career maturity. Recognition of authors with similar publication counts suggests collaborative opportunities, enriching the depth and breadth of research.

In conclusion, the Scopus Analyzer results provide a nuanced understanding of the research landscape on career maturity among students. The upward trajectory of publications indicates sustained interest, while distinct periods suggest phases of exploration and consolidation. Top authors and their diverse contributions underscore the interdisciplinary nature of career maturity studies, offering valuable insights into key themes and methodologies. The global distribution of research outputs, with the United States leading the way, highlights the universal interest in understanding and fostering career maturity. Policymakers, educators, and researchers can leverage this information for evidence-based practices, fostering international collaboration and enriching the global discourse on career development. As the field progresses, these insights serve as a foundation for uncovering unanswered questions and guiding future investigations into the dynamics of career development within academic settings.

Article Contribution to Related Field of Study

This study makes significant contributions to the field of career development and educational psychology. By providing a comprehensive bibliometric analysis, it identifies prevailing trends and gaps in the research on career maturity, guiding future investigations. The insights gained from this study can inform the development of evidence-based career interventions and educational policies. Specifically, educational institutions, particularly secondary schools and career counselling units can utilise these findings to enhance their

career guidance programmes. Moreover, the study underscores the importance of interdisciplinary collaboration and the integration of new technologies in career development research and practice.

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