

COUNSELING GUIDANCE IN SCIENCE EDUCATION: DEFINITION, LITERATURE REVIEW, AND BIBLIOMETRIC ANALYSIS

MUHAMMAD SOLEHUDDIN*, M. MUKTIARNI,
NUR INDRI RAHAYU, RINA MARYANTI

Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi No. 229 Bandung, Indonesia

*Corresponding Author: msolehuddin@upi.edu

Abstract

This study aimed to determine the implementation of counselling guidance in science education from literary considerations and bibliometric analysis. Science education is one of the important subjects to increase student understanding of science and technology. Indeed, its difficulties in science education create the need for counselling guidance for some students. VOSviewer mapping is used to analyse counselling guidance bibliometric data in science education. The reference manager application is used to obtain research data. We used the words "Counselling Guidance" and "science education" as keyword search data for this study. We searched for data from 2017 to 2022. The results showed that research on counselling guidance in science education was found from 2017 to 2022. In addition, the results of research on counselling guidance for science education decreased from 2017 to 2022. The number of guidance publications Counselling for science education is the highest in 2017 with 250 articles published. This study shows how important bibliometric analysis is to obtain information about this phenomenon. This study is prospective to assist and become a reference for scientists and researchers in conducting and deciding on research topics, mainly related to Counselling and science education.

Keywords: Bibliometrics, Guidance counselling, Science education.

1. Introduction

Guidance and counselling services are important aspects of the education system. Counselling services are not only for students who have problems related to discipline but are far more important for developing one's positive attitude [1]. Counselling is a way to professionally connect two or more individuals where a counsellor assists clients in adjusting and finding solutions to their problems. Counselling is a professional relationship between individuals, families, and groups in achieving mental health, education, and career goals [2, 3].

Counselling guidelines and guidance are structured to provide convenience to academic units in realizing the educational process by paying attention to and analysing various abilities, needs and interests according to the characteristics of students [4]. Counselling guidance can also facilitate counsellors to handle and assist individual students who have psychological and psychosocially problems.

Counselling guidance services in education have a significant influence [5]. Counselling guidance services do not only focus on giving and directing students to exercise discipline; furthermore, this guidance also has a role as a regulator of order. It determines policies in the educational environment and how to manage and regulate them until evaluation [6]. This governance principle requires concepts in management and administration, and a counsellor must have management concepts in carrying out guidance and counselling services by mutual rules and agreements [7]. Aside from having a concept, a counsellor carrying out counselling services must also have approaches, strategies, and techniques through various types of services and activities to support counselling services. In addition, counsellors are also required to develop various counselling service programs. Moreover, service media facilitates counselling activities to see to what extent the results of counselling activities are assessed and evaluated on the results and process of counselling services. The final stage is the management of counselling services [8].

Guidance and Counselling is an interdisciplinary process that facilitates students, in this case, in a context related to various aspects, ranging from psychological, social, and economic aspects [9]. Therefore professional Counselling needs to pay attention to these various aspects, starting from the personality, theoretical and methodological skills of students, interests, and talents they have. The process of professional guidance and Counselling involves three main factors: education, family environment, and individual. In general, education influences the approach to carrying out the guidance and counselling process. Guidance and Counselling must be able to facilitate a variety of education because each education has its characteristics; therefore, the research focuses on counselling guidance in science education. Science education provides an overview of the knowledge assimilated and acquired, and these skills are formed to be developed. This will affect science education's guidance and counselling process. Science education is one of the important subjects to increase student understanding of science and technology. Indeed, its difficulties in science education create the need for counselling guidance for some students [10-13].

This study aims to determine counselling guidance for science education through a literature review and bibliometric analysis. We also explain the description of counselling guidance. We use VOSviewer mapping to analyse the data. Keywords are obtained from the relationship between "Counselling Guidance" and science education" to find data for 2017 to 2022. Every year

research on the relationship of counselling guidance with science education has increased, although in 2022 it has decreased. This shows the importance of bibliometric analysis of counselling guidance and science education in the hope that it can help and become a reference for determining research topics. The novelty of this research is on the topic of counselling guidance and science education.

2. Theoretical Framework

2.1. Guidance

Guidance has the basic meaning of the word to guide, direct, or show the way, which is related to providing assistance, information, or assistance to people with difficulty. The guidance also means directing individual thoughts or actions in the right direction by providing correct and appropriate descriptions and guidance in solving problems. Guidance can be interpreted as a process that is developing, mobilizing someone to be able to understand and find talents and interests to be developed to develop themselves and the potential possessed by someone. Counselling guidance as construction in education directs and provides experiences that can help students discover their interests and talents and better understand themselves to be able to live effectively in the environment and society.

Guidance becomes a concept related to optimal individual development, and guidance is a process that helps individuals increase self-understanding (knowing strengths, limitations, and other resources) and solve problems, make choices, and make decisions. The definition above explains that guidance is a continuous process that helps see the development of the entire individual from start to finish; guidance is used as a concept that describes a process. Lack of guidance can lead a person to the wrong thoughts that lead to wrong behavior and inability to adapt.

Guidance is an integrated, organized, and creative process that benefits and can be applied to all everyday life. Guidance becomes a process that has the goal of carrying out individual development in finding solutions and solving problems, furthermore, guidance is defined as a tool in helping to be able to actualize his personality. Guidance is a process that makes it easy for students to see their potential and talents and to be able to choose subjects according to their abilities and needs [14]. Guidance has a role in assisting students in maximizing their abilities and potential so that they can develop using existing resources.

Concerning counselling guidance, guidance is assistance provided by competent counsellors for individuals of all ages to help someone who can direct his own life, a person can develop a point of view and make decisions for his future [15, 16]. Guidance is more directed at giving advice or information given by a counsellor to someone in solving problems or overcoming difficulties.

2.2. Educational guidance

Guidance and Counselling have an essential role in the educational process, educative and formative character is an important feature in professional counselling guidance [17]. The type of education will affect the guidance and counselling process provided to clients or students, in the realm of counselling guidance education, it can be distinguished from the form of guidance which is related to the adjustment of the problems faced by curriculum, characteristics, and environment of educational institutions in general [18]. Guiding clients or students in pursuing appropriate

education according to their talents and interests [19]. Globalization and the development of science in various fields, especially in science education, have opened the way for young people to choose a career and their future. The explosion of knowledge and the shift in the times have confused young people in choosing and facing the challenges ahead. Guidance and Counselling are essential parts of the educational process [20, 21]. Counselling guidance can help clients or students build a positive attitude, counselling guidance has an important goal in the educational process, namely, to manage disciplinary problems and provide guidance in dealing with problems faced by clients or students [22].

2.3. Counselling

Counselling is a personal relationship between a professionally trained counsellor and a person or individual who has a problem, and this relationship occurs in the context of solving problems and communicating and finding solutions to the problems faced. Counselling becomes an interactive process that facilitates understanding a person and the surrounding environment.

Counselling is a process that gives an idea to someone to choose the choice, not to force beliefs or behavior on someone [23]. Counselling is a process in which the counsellor helps the counselee to be able to interpret facts and findings related to choices and plans for the necessary suitability. Counselling is defined as a series of direct contact between individuals and counsellors to offer assistance to change attitudes and behavior.

Guidance and Counselling are used for better self-understanding. Guidance and Counselling can facilitate individuals to recognize the talents and abilities possessed by someone, and this can direct them in a better direction [24]. The guidance and counselling process can provide advice and information for improving one's career, allowing one to develop good habits and avoid attitudes that are not by those in society.

Counselling also further facilitates consulting, discussing, and exchanging views to solve problems and find directions that follow the goals. This definition illustrates that Counselling is not carried out in one direction but is a two-way process that helps each other. The counselling process is carried out when a person privately and secretly expresses and explores the difficulties he is experiencing to a counsellor [25, 26]. The counsellor will listen carefully to complaints submitted by someone to be given an overview of the solutions to the problems faced (Hughes and Kinder).

2.3.1. Counselling types

a) Directive counselling

The counsellor has a significant and active role in the counselling process, and the counsellor has a role as a means of helping someone who is facing problems. The counselling process is centered on the counsellor, in this process, the counsellor does everything himself starting from analysing, synthesizing, diagnosing, prognosing, and following up. In implementing Counselling focused on the most important problems, counsellors have a more active role than clients or students. During the decision-making process, the counsellor does his best to make the best decision. Clients or students who have problems will be directed by the counsellor so that they

can choose and decide the best solution to the problem being faced. There are six stages in this type of Counselling. The first stage is analysis, at this stage, the counsellor collects data from various sources in order to know and understand the problem at hand. The next stage is synthesis, at this stage, the counsellor organizes and summarizes the data for analysis. After the data is analysed, the counsellor then predicts the development of improvements to the problems the client is facing. The following process is that the counsellor conducts Counselling with the client to provide solutions to the problem. The final step is a follow-up, which provides an overview and assistance to the client in solving problems.

b) Non-directive counselling

This Counselling gives freedom to clients or students in carrying out the counselling process, in this process, the client or student is the center. Implementation of non-directive Counselling makes clients more independent in finding solutions to their problems. In this counselling process, the client comes to the counsellor and explains the problem, and the counsellor builds mutual trust during the counselling process. Clients provide all information related to their problems, and counsellors help conduct analysis and synthesis and assist in decision-making. In the process, clients are free to discuss problems and find solutions to their problems.

c) Eclectic counselling

This Counselling is a combination of Directive Counselling and Non-Directive Counselling, which is carried out according to the situations and cases clients or students face. This counselling approach is the best because it is more flexible and adapts according to needs. In this counselling process, a person can take advantage of the procedures following the implementation. In the early stages, the counsellor can start with directive techniques and can switch to non-directive Counselling, this is according to his needs, or the counsellor can also use a combination of directive and non-directive counselling techniques and also of other types according to the needs of the problems faced by the counselee. This counselling process concludes that the applicable theory is not an absolute thing that a client must follow in dealing with problems, the solutions to problems between one client and another can be different and cannot be equated.

3.Method

This study used the visualization mapping method using the VOSviewer application to process bibliometric data for research publications. A data search was carried out using the PoP 7 application on December 19, 2022. The articles retrieved were articles published in Google Scholar-indexed journals for the period 2017 to 2022. The use of Google Scholar as a source of data collection is due to its open-source nature and ability to index a broader range of publications. The search keywords are "counselling guidance for science education," OR "counselling guidance," OR "Counselling." Search results are stored in two files, *.ris and *.csv. Data processing uses automatic analysis using the VOSviewer application and manual analysis using Microsoft Excel. Data mapping is done after the data selection process. Data mapping is analysed to discover developments, research trends, and other fields and terms often associated with the study material in

counselling guidance for science education research. The data that has been mapped is then analysed to see the development of research regarding counselling guidance for science education. Detailed information for the use of VOSviewer is presented in the literature [27, 28].

4. Results and Discussion

4.1. Counselling guidance for science education publication development

The search results for publication data regarding counselling guidance for science education found 991 article data. The title and abstract are used as a reference for adjusting the data to the chosen research topic, namely "counselling guidance for science education". The research matrix concerns the number of citations for carbon adsorption isotherm research indexed in Google Scholar. The research year taken is five years, from 2017 to 2022. The number of research citations is 25344 citations. The average citation per article regarding this research is 25.52 and the average citation per year is 5068.80. Articles on counselling guidance for science education have an h-index of 69 and a g-index of 110. The h-index value indicates the level of productivity and impact of the research conducted [29]. The greater the H-index value, the more advanced the research in that field is [30].

Based on the analysis of the article with the most citations, one of the most cited is article entitled "Renal mass and localized renal cancer: AUA guideline" with 1078 citations and published in 2021. However, the most prospective for the published article is article entitled "Management of cancer cachexia: ASCO guideline" that is published in 2020, which is possibly generating more citations. Detailed information for the most cited papers are in the following:

- (i) Renal mass and localized renal cancer: AUA guideline (Cited by 1078; published in 2021).
- (ii) Using intersectionality responsibly: Toward critical epistemology, structural analysis, and social justice activism (Cited by 431; published in 2017).
- (iii) Meta-analyses of the relationship between conformity to masculine norms and mental health-related outcomes (Cited by 402; published in 2017).
- (iv) Applying intersectionality to explore the relations between gendered racism and health among Black women (Cited by 272; published in 2017).
- (v) Projecting the supply and demand for certified genetic counselors: a workforce study (Cited by 242; published in 2018).
- (vi) Health disparities between genderqueer, transgender, and cisgender individuals: An extension of minority stress theory (Cited by 225; published in 2019).
- (vii) Management of cancer cachexia: ASCO guideline (Cited by 221; published in 2020).
- (viii) Work as a calling: A theoretical model (Cited by 220; published in 2018).
- (ix) The development and initial validation of the Decent Work Scale (Cited by 220; published in 2017).
- (x) Impostor feelings as a moderator and mediator of the relationship between perceived discrimination and mental health among racial/ethnic minority college (Cited by 213; published in 2017).

Figure 1 shows the development of research published in Google Scholar-indexed journals regarding counselling guidance for science education. Research on counselling guidance for science education has decreased from 2017 to 2022. The decline in the number of publications is very significant, as shown in Fig. 1. The highest number of publications regarding counselling guidance for science education was in 2017 with 250 articles published. In 2018 the number of publications was 222 articles. In 2019 the number of publications was 183 articles. In 2020 there were 146 articles. In 2021 there will be 117 articles and in 2022 the number of publications regarding counselling guidance for science education will only be 73 articles. The development of research on counselling guidance for science education can be used as material for consideration of research on counselling guidance for science education which will be carried out in the future. The consideration that can be made is whether the research trend regarding counselling guidance for science education is still relevant.

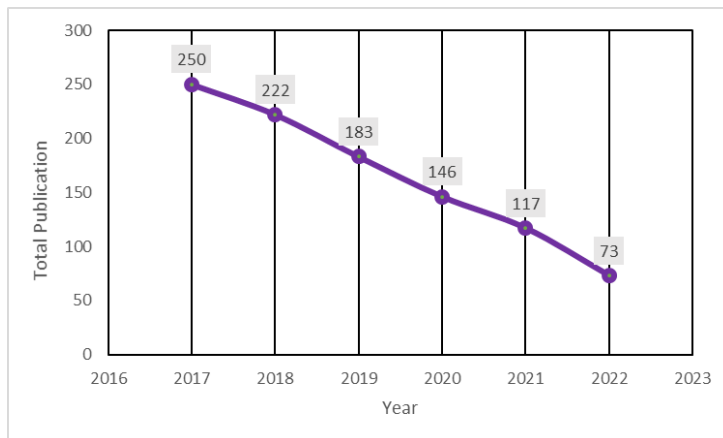


Fig. 1. Counselling guidance for science education publication development.

4.2. Counselling guidance for science education publication mapping visualization

Based on the mapping results, 5355 related terms were found in research regarding counselling guidance for science education. We determined the number of occurrences of the term at least 5 times so that 292 terms were found. We selected the most relevant 60% of terms, resulting in 175 terms found. We verified the selection of terms so that 82 terms were found for mapping visualization by paying attention to their relevance and connection with adsorption isotherm carbon research.

Figure 2 shows a visualization of the publication network regarding counselling guidance for science education from 2017 to 2022. The network visualization shows the linkages and the strength of the relationship through the value of the term link strength [31]. The greater the link strength value, the stronger the relationship between terms.

The colour size of the nodes in the visualization network represents the number of occurrences of terms [32]. The larger the nodes in the network visualization image, the larger the terms appear [33], and the thicker the links between nodes, the stronger the relationship between terms [33, 34]. Network visualization divides

each term into several groups or clusters. The terms regarding research regarding counselling guidance for science education are divided into 9 clusters. Table 1 shows the distribution of clusters in the research analysis mapping regarding counselling guidance for science education.

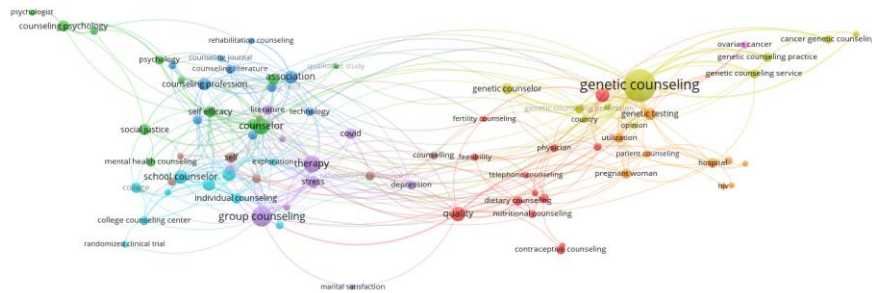


Fig. 2. Network visualization of counselling guidance for science education publication.

Table 1. Cluster mapping analysis.

Cluster	Colour	Items	Items
1	Red	13	Cancer, contraceptive Counselling, counselling patient, dietary Counselling, feasibility, fertility counselling, nutrition, nutritional Counselling, physical activity, physician, primary care, quality, and telephone counselling.
2	Green	12	Career counselling, counselling process, counselling psychology, counselling psychology, mental health counselling, professional counsellor, psychologist, psychology, qualitative study, self-efficacy, and social justice.
3	Blue	10	Association, counselling competency, Counselling field, counselling journal, counselling literature, counselling profession, gender, professional Counselling, rehabilitation counselling, and technology.
4	Yellow	10	Cancer genetic counselling, country, covid19 pandemic, genetic Counselling, genetic counselling practice, genetic Counselling professional, genetic counselling service, genetic counselling service, genetic counselling student, genetic counsellor, and opinion.
5	Purple	10	Covid, depression, group counselling, literature, marital satisfaction, psychological Counselling, self-esteem, solution, stress, and therapy.
6	Cyan	10	College, college counselling center, college student, exploration, family counselling, individual Counselling, randomized clinical trial, school counselling, school counsellor, and school counsellors.

7. Nkechi, E.E.; Ewomaoghene, E.E.; and Egenti, N. (2016). The role of guidance and counselling in effective teaching and learning in schools. *RAY: International Journal of Multidisciplinary Studies*, 1(2), 36-48.
8. Keshf, Z.; and Khanum, S. (2021). Career guidance and counselling needs in a developing country's context: A qualitative study. *SAGE Open*, 11(3), 21582440211040119.
9. Gorghiu, G.; Gorghiu, L.M.; Petrescu, A.M.; and Drăghicescu, L.M. (2013). Aspects related to counselling and guidance in science lessons contexts. *Procedia-Social and Behavioral Sciences*, 92, 358-363.
10. Maryanti, R.; Nandiyanto, A.B.D.; Hufad, A.; and Sunardi, S. (2021). Science education for students with special needs in Indonesia: From definition, systematic review, education system, to curriculum. *Indonesian Journal of Community and Special Needs Education*, 1(1), 1-8.
11. Maryanti, R.; and Asjjari, M. (2022). Family as an educational environment that can provide science education for children with special needs. *Indonesian Journal of Community and Special Needs Education*, 2(2), 149-154.
12. Effiong, J.B.; and Aya, C.F. (2022). Rural-urban migration among women farmers: Science education, survey, and implication for food crop production in Cross River State, Nigeria. *Indonesian Journal of Teaching in Science*, 2(1), 75-80.
13. Maryanti, R.; and Nandiyanto, A.B.D. (2021). Curriculum development in science education in vocational school. *ASEAN Journal of Science and Engineering Education*, 2(1), 151-156.
14. Mohanty, S.K.; and Mukhopadhyay, B. (2016). A study on feedback to improve counselling skills training of technical teachers. *Asian Journal of Research in Social Sciences and Humanities*, 6(7), 1521-1531.
15. Dogar, A.H.; Azeem, M.; Majoka, M.I.; Mehmood, A.; and Latif, S. (2011). Need assessment of students' guidance and Counselling. *British Journal of Arts and Social Sciences*, 1(2), 108-124.
16. Baugh, A. (2018). The importance of guidance and counselling in present education system: Role of the teacher. *International Journal of Advanced Educational Research*, 3(2), 384-386.
17. Alfaiz, A. (2018). Guidance and counselling profession: A philosophy and professional challenges in the future. *COUNS-EDU: The International Journal of Counselling and Education*, 3(1), 41-47.
18. Nkechi, E.E.; Ewomaoghene, E.E.; and Egenti, N. (2016). The role of guidance and counselling in effective teaching and learning in schools. *RAY: International Journal of Multidisciplinary Studies*, 1(2), 36-48.
19. Singh, M.G. (2018). Educational guidance and counselling concept and its development strategies. *Differences*, 2(3), 46-52.
20. Reed, H.J. (1964). Guidance and counselling. *The Journal of Negro Education*, 33(3), 282-289.
21. Dinkmeyer, D. (1970). Developmental group counselling. *Elementary School Guidance and Counselling*, 4(4), 267-272.

22. Bakar, A.Y.A.; Dawson, C.S.; and Ifdil, I. (2020). Students discipline problems perception of counselling services: a qualitative analysis. *Journal of Counselling and Educational Technology*, 3(2), 62-67.
23. Elliott, G.R. (2011). When values and ethics conflict: The counselor's role and responsibility. *Alabama Counselling Association Journal*, 37(1), 39-45.
24. Darwin, M.R.; Farozin, M.; and Retnawati, H. (2020). What career guidance and counselling services are needed by senior high school students?. *Jurnal Pendidikan Indonesia*, 9(4), 608-617.
25. Naparan, G.B. (2020). Assessment of conventional counselling technique: basis for scripture-based counselling. *International Journal of Emerging Issues in Early Childhood Education*, 2(2), 83-95.
26. Fatchurahman, M. (2019). The use of self-information and environment in counselling process. *Anterior Jurnal*, 19(1), 69-88.
27. Azizah, N.N.; Maryanti, R.; and Nandiyanto, A.B.D. (2021). How to search and manage references with a specific referencing style using google scholar: From step-by-step processing for users to the practical examples in the referencing education. *Indonesian Journal of Multidisciplinary Research*, 1(2), 267-294.
28. Al Husaeni, D.F.; and Nandiyanto, A.B.D. (2022). Bibliometric using Vosviewer with publish or perish (using google scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post covid-19 pandemic. *ASEAN Journal of Science and Engineering*, 2(1), 19-46.
29. Dettori, J.R.; Norvell, D.C.; and Chapman, J.R. (2019). Measuring academic success: the art and science of publication metrics. *Global Spine Journal*, 9(2), 243-246.
30. Mingers, J.; Macri, F.; and Petrovici, D. (2012). Using the h-index to measure the quality of journals in the field of business and management. *Information Processing and Management*, 48(2), 234-241.
31. Al Husaeni, D.N.; and Nandiyanto, A.B.D. (2023). A bibliometric analysis of vocational school keywords using vosviewer. *ASEAN Journal of Science and Engineering Education*, 3(1), 1-10.
32. Nandiyanto, A.B.D.; Al Husaeni, D.N.; and Al Husaeni, D.F. (2021). A bibliometric analysis of chemical engineering research using vosviewer and its correlation with covid-19 pandemic condition. *Journal of Engineering Science and Technology*, 16(6), 4414-4422.
33. Al Husaeni, D.F.; Nandiyanto, A.B.D.; and Maryanti, R. (2023). Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research. *Indonesian Journal of Teaching in Science*, 3(1), 1-8.
34. Nandiyanto, A.B.D.; and Al Husaeni, D.F. (2022). Bibliometric analysis of engineering research using vosviewer indexed by google scholar. *Journal of Engineering Science and Technology*, 17(2), 883-894.
35. Al Husaeni, D.F.; and Al Husaeni, D.N. (2022). Computational bibliometric analysis of research on science and Islam with VOSviewer: Scopus database in 2012 to 2022. *ASEAN Journal of Religion, Education, and Society*, 1(1), 39-48.

36. Crook, A.; Jacobs, C.; Newton-John, T.; O'Shea, R.; and McEwen, A. (2022). Genetic counselling and testing practices for late-onset neurodegenerative disease: A systematic review. *Journal of Neurology*, 269(2), 676-692.
37. Nandiyanto, A.B.D.; Ragadhita, R.; Al Husaeni, D.N.; and Nugraha, W.C. (2023). Research trend on the use of mercury in gold mining: Literature review and bibliometric analysis. *Moroccan Journal of Chemistry*, 11(1), 1-19.
38. Gunawan, B.; Ratmono, B.M.; Abdullah, A.G.; Sadida, N.; and Kaprisma, H. (2022). Research mapping in the use of technology for fake news detection: Bibliometric analysis from 2011 to 2021. *Indonesian Journal of Science and Technology*, 7(3), 471-496.
39. Utama, D.M.; Santoso, I.; Hendrawan, Y.; and Dania, W.A.P. (2023). Sustainable production-inventory model with multi-material, quality degradation, and probabilistic demand: From bibliometric analysis to a robust model. *Indonesian Journal of Science and Technology*, 8(2), 171-196.
40. Sahidin, I.; Nohong, N.; Manggau, M.A.; Arfan, A.; Wahyuni, W.; Meylani, I.; Malaka, M.H.; Rahmatika, N.S.; Yodha, A.W.M.; Masrika, N.U.E.; Kamaluddin, A.; Sundowo, A.; Fajriah, S.; Asasutjarit, R.; Fristiody, A.; Maryanti, R.; Rahayu, N.I.; and Muktiarni, M. (2023). Phytochemical profile and biological activities of ethylacetate extract of peanut (*Arachis hypogaea* L.) stems: In-vitro and in-silico studies with bibliometric analysis. *Indonesian Journal of Science and Technology*, 8(2), 217-242.
41. Maryanti, R.; Rahayu, N.I.; Muktiarni, M.; Al Husaeni, D.F.; Hufad, A.; Sunardi, S.; and Nandiyanto, A.B.D. (2022). Sustainable development goals (SDGs) in science education: Definition, literature review, and bibliometric analysis. *Journal of Engineering Science and Technology*, 17 (Special issue on ICMSCE 2022), 161-181.