BIBLIOMETRIC ANALYSIS FOR DEVELOPMENT OF ANALYTICAL THINKING BASED ASSESSMENT

Yasmine Hadiastriani
Postgraduate School/Pakuan University
INDONESIA
Yasmine.hadiastriani@gmail.com

Prasetyorini
Faculty of Mathematics and Natural Science/Pakuan University, **INDONESIA**
prasetyorini@unpak.ac.id

ABSTRACT

The results of the PISA study and test have shown that the majority of Indonesian students are unable to understand simple texts or apply basic mathematical concepts. The low scores of students are caused by the low attention of students in carrying out tests and exams by using questions that are oriented towards analytical thinking. The aim of this article is to provide an extensive review of the bibliometric literature on 'development of an analysis-based science assessment instrument'. Articles found with Harzing Publish or Perish (PoP) software with Google Scholar database. There are 107 out of 342 articles found from the Google Scholar database from 2018 to 2022 that were analyzed in this study. The selected references are then managed using a reference manager software, namely Mendeley Desktop. After managing the database, this research classifies and visualizes using the VOSviewer software. Overall, this review provides an appropriate reference for further research on 'development of analysis-based science assessment instruments'. The selected references are then managed using a reference manager software, namely Mendeley Desktop. After managing the database, this research classifies and visualizes using the VOSviewer software. Overall, this review provides an appropriate reference for further research on 'development of analysis-based science assessment instruments'.

Keywords: Instruments, Assessment, Analytical Thinking, Literacy.

INTRODUCTION

The Ministry of Education, Culture, Research and Technology (Kemendikbudristek) of Indonesia provides three curriculum options that can be implemented by school in learning, namely the 2013 curriculum, the emergency curriculum, and the prototype curriculum for education in 2022 to 2024. The Merdeka Belajar Curriculum is the development and implementation of the emergency curriculum launched to respond to the impact of the Covid-19 pandemic. The definition of Merdeka Belajar curriculum is an approach that is taken so that students and students can choose subjects of interest (Wiguna & Made, 2022).

Indonesia is included in the 10 countries with the lowest scores which are ranked 62, 63 and 64 for the category of scientific literacy and numeracy abilities. The results of the study as well as the results of the PISA exam have shown that the majority of Indonesian students are unable to understand simple reading or apply basic mathematical concepts. (Pertiwi et al., 2018).

This shows that assessment instruments to measure higher order thinking skills are very important. The questions in an assessment not only serve to evaluate student understanding, but also stimulate students to think. This is in accordance with the statement put forward by

Santhitiwanich et al (2013) which states that a special test is needed for teacher to measure and assess students' analytical thinking abilities (Adh'ya & Endang, 2018).

Based on the background above, the authors were moved to conduct a study to develop an assessment that would assess students' analytical thinking that were integrated with students' scientific literacy and numeracy abilities. In order to evaluate the level of analytical thinking, a standardized learning outcomes instrument is needed, a standardized learning outcomes instrument is needed which can also be used to measure science process skills. Therefore, as a first step, the authors conducted a bibliometric analysis.

LITERATURE REVIEW

The Merdeka Belajar Curriculum was launched as a form of evaluation to improve the 2013 Curriculum which is one of the government's efforts to produce the next generation who are more competent in various fields (Wiguna & Made, 2022). The results of the 2015 Program for International Students Assessment (PISA) show that the average scientific literacy score of 15-year-old Indonesian students is 403, while the average scientific literacy score of all countries participating in this assessment program is 493 (Adh'ya & Endang, 2018).

Assessment is an important part of the learning process. Assessment related to the objectives and learning process. A learning process includes planning, implementing the learning process, assessing learning outcomes, and student evaluation (Waluyati, 2012). A good learning process will not succeed without good assessment. Assessment is expected to reflect the ability of students as a whole, both in terms of knowledge, attitudes, and skills (Irwanto et al., 2017) and able to stimulate students to optimize their potential (Keterllin-Geller, 2005; Abel, 2006). Therefore, assessment and learning outcomes are two components that cannot be separated.

There are three important dimensions of science, namely: 1) science material content, basic concepts and scientific knowledge 2) the process of doing science and 3) scientific attitude (Opateye, 2012). One of the important domains for the development of scientific literacy is science process skills (Ongowo & Indoshi, 2013). Scientific ability is one of the cognitive skills that can be measured, this is because scientific ability is related to the cognitive domain of students, one of which includes the ability to think analytically. (Subali, 2011; Astuti et al., 2017) One of the higher order thinking skills is analytical thinking. Analytical thinking is not just memorizing facts, but efforts to increase complex and creative understanding to achieve better learning goals. Analytical thinking ability is a higher cognitive level that can be achieved by students after mastering low-level cognitive domains such as remembering, understanding, and low-level cognitive skills such as remembering, understanding, and applying. (Stone et al, 2014).

Montaku et al, (2012) stated that low student scores were caused by low student attention in conducting tests and examinations by using question-oriented questions that were oriented towards analytical thinking. This is in line with the statement of Fensham & Bellochi (2013) that most assessments of science learning outcomes still focus on low-level thinking skills, where the questions given by the teacher to students are still rote without thinking. This is in accordance with the results of observations made by Eka Ad'hiya (2018) on high school students which showed the results that 19.3% of students stated that they strongly agreed, 57.89% of students agreed and 22.8% of students stated that they did not agree that the questions given by the teacher in the form of memorization. And the results of the questionnaire also show that 17, 5% of students stated that they strongly disagreed, 78.9% of students stated that they did not

agree, 3.5% of students agreed that the evaluation given by the teacher was in the form of reasoning questions. This means that teachers at school only use assessment instruments that measure memorization or other lower-order thinking skills.

Bibliometric analysis has received tremendous attention in research over the last few years (Donthu et al., 2020; Donthu, et al., 2021; Khan et al, 2021), this can also be attributed to (1) the advancement, availability, and accessibility of bibliometric software such as Gephi, Leximancer, VOSviewer, and scientific databases such as Scopus and Web of Science, and (2) the cross-disciplinary linkages of bibliometric methodologies. Bibliometric analysis in research is a reflection of its usefulness for (1) handling large volumes of scientific data, and (2) generating high research impact. (Donthu, et al., 2021)

Bibliometric analysis was carried out to see if there were gaps in the research with previous studies. This analysis was carried out by looking at articles published and indexed by Google Scholar and analyzed and categorized based on the distribution of authors and their affiliations. This analysis can see which research topics are the subject of more publications, and 'Developing Science Analytical Thinking Examination' topics that provide opportunities for further research. The methodology applied to carry out the analysis is to use bibliometric analysis, including steps of the bibliometric method, including method steps related to the implementation of Google Scholar and Harzing Publish or Perish data-based software. The found articles were then analyzed using Mendeley Desktop followed by a discussion session and conclusions from the results of the literature study using bibliometric analysis using the VOSViewer software. (Hudha et al., 2020).

METHODOLOGY

This bibliometric analysis is based on a systematic and explicit method (Garza-Reyes, 2015) or the mind mapping method that emphasizes the limits of knowledge. This research method adopted a five-stage method (Tranfield et al., 2003; Setyaningsih et al., 2018) as in Figure 1.

Figure 1. Five Stages of Bibliometric Analysis

Define Search Keywords

A literature search was conducted in November 2022 with the keyword 'Developing Science Analytical Thinking Assessment'. Google Scholar was chosen because it is one of the largest databases and Harzing Publish or Perish was chosen because it has proven to be the most effective way to find articles on Google Scholar (Baneyx, 2008). The first search used Harzing Publish or Perish software with the keyword 'Developing Science Analytical Thinking Assessment'.

Initial Search Results

This search is specific to 'journal', 'keyword' only, and the year '2018-2022'. Thousands of articles found in the initial search. The results are compiled in a Research Information Systems (RIS) format to include all important article information such as paper title, author name and affiliation, abstract, keywords and references.

Improved Search Results

Appropriate and indexed articles in the Google Scholar database are filtered. Proceedings, newspapers, books, book reviews and book chapters are not included in this data. Only selected journal articles. Then to make the appropriate repairs, the file is saved in the form of a RIS file. RIS data imported into the VOSViewer bibliography software. The resulting RIS files were used for further data analysis (Hudha et al., 2020).

Data Analysis

Bibliometric analysis in this study used Harzing Publish or Perish software (Baneyx, 2008; Parmar et al., 2019). However, to analyze and visualize the bibliometric network, the VOSViewer software (Martinez-López et al., 2019;Shukla et al., 2020) is used for its ability to work efficiently with large data sets and provides a variety of compelling visuals, analysis, and investigations (van Eck & Waltman, 2010). VOSViewer can also create a publication map, author map, or journal map based on a shared citation network or to build a keyword map based on a shared citation network (van Eck & Waltman, 2010).

RESULTS AND DISCUSSION

Literature review plays an important role in academic research to gather existing knowledge and to examine the state of a field (Kunisch et al., 2018). Researchers usually gather available evidence about a topic or problem before undertaking new research to assess the state of the evidence that is already available (Linnenluecke et.al., 2020). The literature review can focus on identifying the main research streams and future research directions (Linnenluecke et al., 2017). In other cases, a researcher may wish to investigate a new line of research (Chai, 2018, 2019) or build a new theory. In this case, the key question is: What is the new research area/theory, and how does it relate to existing fields or theories. Literature reviews can be useful if a researcher is motivated by a lack of research on a particular problem or topic; even though there may be only a few relevant studies, such a review can still form the basis for discussion of knowledge gaps, and how a researcher intends to fill them.

Analysis of Publication Structure and Citations

The first step is to make a Bibliometric analysis by looking for journal articles both nationally and internationally related to the research topic that I will be doing, namely Developing Science Analytical Thinking Examination, then analyzing the articles. The output is analyzed based on Harzing Publish or Perish software through VOSviewer software to determine the keywords that appear most frequently. However, the number of keywords that appear most often is adjusted to the needs of data collection and analysis, namely regarding the Developing Science Analytical Thinking Examination. VOSviewer is used to visualize bibliometric maps. This software shows bibliometric mapping on three different visualizations namely, Network Visualization, Overlay Visualization, and Density Visualization.

Before improving the search results, 1,000 articles were obtained through the Google Scholar database. After refinement, 324 articles were aggregated from the Google Scholar database. This data has been well verified on the Google Scholar database from 2018 - 2022 with the keywords 'developing science analytical thinking examination'. Refinement of results obtained 324 articles; citation data also changed, with 914 citations and 228.50 citations/year. The complete results of the comparison of matrix data from the initial search and the enhanced search can be seen in Table 1.

Table 1. Comparison Matrix

Data Matrix	Early Search	Search Enhancements
Search Source	*'Developing Science Analytical Thinking Examination'*	*'Developing Science Analytical Examination'*
Year of Publication	2018 - 2022	2018 - 2022
Papers	1000	107
Citation	1079	894
Citation/year	269.75	223.50
Citations/articles	1.08	8.36
Author	1.39	2.32
h_index	16	16
g_index	23	23
hI_norm	11	11
hI_annual	2.75	2.75
hA_index	9	9

The author tries to present the most relevant contributions in this research. The steps taken were to take 107 articles with the keywords "Developing Science Analytical Thinking Examination", which had the highest citation score (top 10 articles). Obtained results as in Table 2.

Table 2. Ten Articles with the Highest Citations

No	Year of Publication	Writer	Title	Journal	Citation	Publisher
1.	2019	Bezanilla, Maria J.; Fernández N.; Donna P.; Manuel G.; Hector.	Methodologies for teaching-learning critical thinking in higher education: The teacher's view	Thinking Skills and Creativity	44	Elsevier BV
2.	2018	Sasson, I.; Judah, I.; Malkinson, N.	Fostering the skills of critical thinking and question-posing in a project-based learning environment	Thinking Skills and Creativity	36	Elsevier BV
3	2019	Waterman, Kevin P; Goldsmith, L.; Pasquale, M.	Integrating Computational Thinking into Elementary Science Curriculum: an Examination of Activities that Support Students' Computational Thinking in the Service of Disciplinary Learning	Journal of Science Education and Technology	30	Springer Science and Business Media LLC
4	2020	Akpur, U.	Critical, Reflective, Creative Thinking and Their Reflections on Academic Achievement	Thinking Skills and Creativity	29	Elsevier BV

5	2019	D'Alessio, F. .; Avolio, B.E.; Charles, V.	Studying the impact of critical thinking on the academic performance of executive MBA students	Thinking Skills and Creativity	25	Elsevier BV
6	2018	Setiawan, A.; Malik, A.; Suhandi, A.; Permanasari, A.	Effect of Higher Order Thinking Laboratory on the Improvement of Critical and Creative Thinking Skills	IOP Conference Series: Materials Science and Engineering	24	IOP Publishing
7	2019	Walsh, C.; Quinn, KN; Wieman, C.; Holmes, N.G.	Quantifying critical thinking: Development and validation of the physics lab inventory of critical thinking	Physical Review Physics Education Research	22	American Physical Society (APS)
8	2020	Decker, Teun J	Teaching critical thinking through engagement with multiplicity	Thinking Skills and Creativity	19	Elsevier BV
9	2020	Polat, Ö.; Aydin, E.	The effect of mind mapping on young children's critical thinking skills	Thinking Skills and Creativity	17	Elsevier BV
10	2018	Smith, TE; Rama, PS; Helms, Jr	Teaching critical thinking in a GE class: A flipped model	Thinking Skills and Creativity	17	Elsevier BV

The most relevant contribution in this study is the number of citations. Based on table 2, the highest indexed citations indexed by Google Scholar are articles from Bezanilla et al. in 2019. This article discusses teachers' opinions regarding methods for learning to teach critical thinking skills in higher education (Bezanilla et al., 2019). This article was cited in 44 research articles. Meanwhile, there is one publisher with the highest citation frequency based on data, namely Elsevier.

In addition, the publishers that contributed the most articles to this study were also analyzed. In the 67 articles published, 42 articles were published from major publishers namely Elsevier, followed by Informa UK Limited 16 articles, University of Muhammadiyah Malang 3 articles, Hampstead Psychological Associates, IOP Publishing, and National Science Teachers Association (NSTA) 2 articles each. For other publishers, an average of 1 article is published on this topic. The top four publishers who published articles on this topic are listed in Table 3.

Table 3. Six Highest Publishers Publishing Developing Science Analytical Thinking Topics

No.	Publisher	Number of Articles
1.	Elsevier BV	42
2.	Informa UK Limited	16
3.	Malang Muhammadiyah University	3
4.	Hampstead Psychological Associates	2
5.	IOP Publishing	2
6.	National Science Teachers Association (NSTA)	2

In addition to the number of articles per publisher, it is also analyzed based on the relevance of the journal. The result is the top 6 journals that cover this topic. There is a journal that has the most citations, namely Thinking Skill and Creativity with 404 citations. This shows that articles with subjects related to the development of scientific assessment are scattered in certain journals. The journal in which the relevant article is presented at Table 4.

Table 4. Six Journals with the Highest Relevance in Developing Science Analytical Topics

No.	Journal	Number of Articles	Number of Citations
1.	Thinking Skills and Creativity	42	404
2.	Critical Reviews in Analytical Chemistry	16	212
3.	JPBI (Indonesian Biology Education Journal)	3	10
4.	International Journal of Psychosocial Rehabilitation	2	4
5.	IOP Conference Series: Materials Science and	2	25
6.	Engineering Science Scope	2	4

Overlay visualization analysis and density visualization were used to identify key themes in each study or knowledge area. This result is done by measuring the co-occurrence of keyword pairs (Liu et al., 2015; Nangy, 2018). Analysis was performed with the help of VOSviewer software. It can be identified that each cluster is connected with other keywords. This can be indicated that the development of research on this subject is interrelated. Network analysis also allows identification of author authorities (Bilik et al., 2019). Co-author analysis is a widely used bibliometric research technique that investigates authors conducting joint research from a particular field. The Network Visualization display on Google Scholar data related to the keyword 'Developing Science Analytical Examination' which has been filtered in searches can be seen in Figure 2, Overlay Visualization can be seen in Figure 3, and Density Visualization in Figure 4.

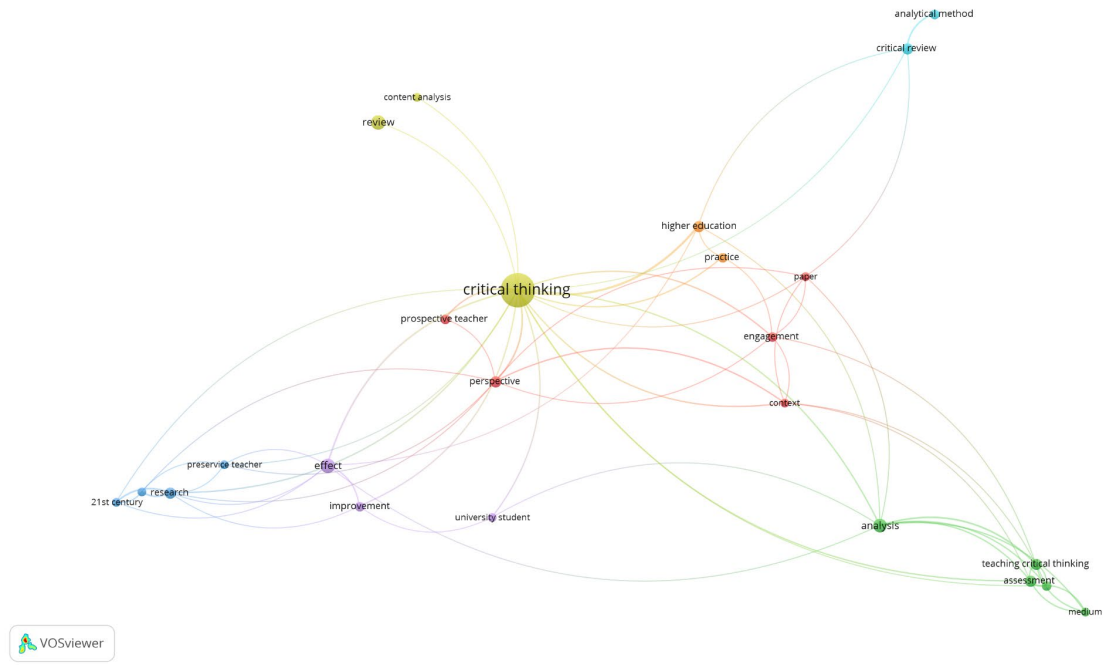

Figure 2. Network Visualization Based on the Google Scholar Database

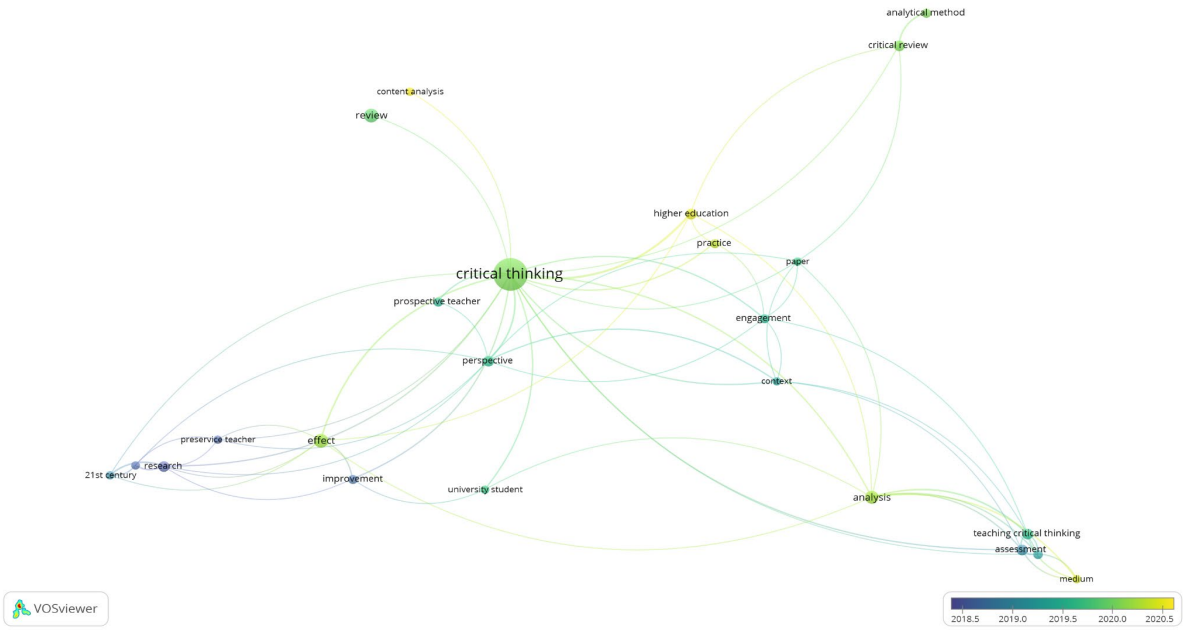

Figure 3. Overlay Visualization Based on the Google Scholar Database

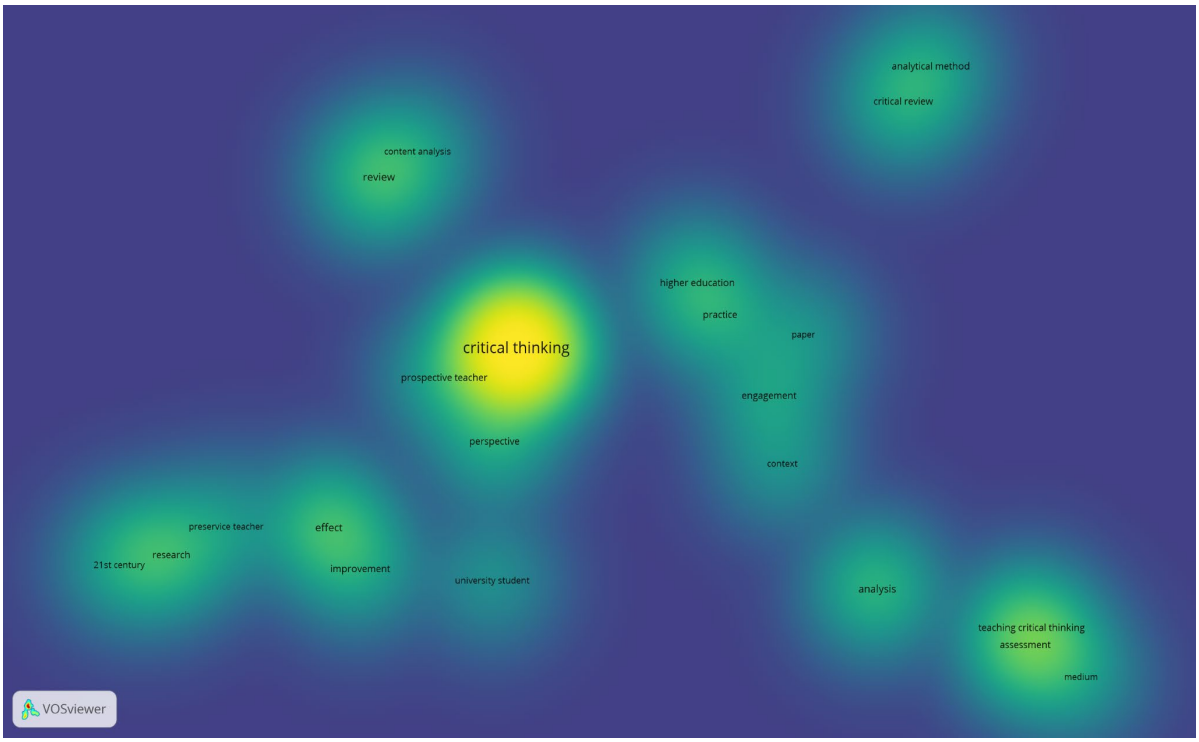

Figure 4. Density Visualization Based on the Google Scholar Database

These results were analyzed from titles, keywords, and abstracts with a full calculation of the minimum number of occurrences which was set to 3. Around 24 items were found grouped into 7 clusters connected to each other by 63 links. Common words are excluded in this item. Each item representing a keyword is added, which is indicated by the size of the node. In other words, node size indicates the frequency of co-occurrence of keywords. The keywords that appear in each group representing the Developing Science Analytical Thinking Examination can be seen in Table 5.

Table 5. Keywords that describe each cluster

No.	Cluster	Element
1.	First Cluster (Red)	context (3), engagement (4), paper (3), perspective (5), prospective teacher (4)
2.	Second Cluster (Green)	analysis (7), assessment (5), medium (3), teaching critical thinking (5), use (4)
3.	Third Cluster (Blue)	21st century (3), preservice teacher (3), research (5), variable (3)
4.	Fourth Cluster (Yellow)	content analysis (3), critical thinking (46), review (8)
5.	Fifth Cluster (Purple)	effect (8), improvement (4), university student (3)
6.	Sixth Cluster (Tosca)	analytical methods (4), critical review (5)
7.	Seventh Cluster (Orange)	practice (5), higher education (4)

The relationship between the Author and his Authorship

Analysis of the linkages between authors and networks related to each other with patterns of collaboration between individuals can be seen in Figure 5. In this network, each node represents the author in his writing relationship. Many different dimensions can be integrated in this analysis to visualize clusters and associations between dimensions or changes over time. Figure 5 shows an analysis of the network of authors seen by year of co-authors. In this case, the author's relationship can be classified as their annual relationship. It is proven that Hong is the

writer who has the most relationships with other writers. Meanwhile, recent studies are marked in yellow.

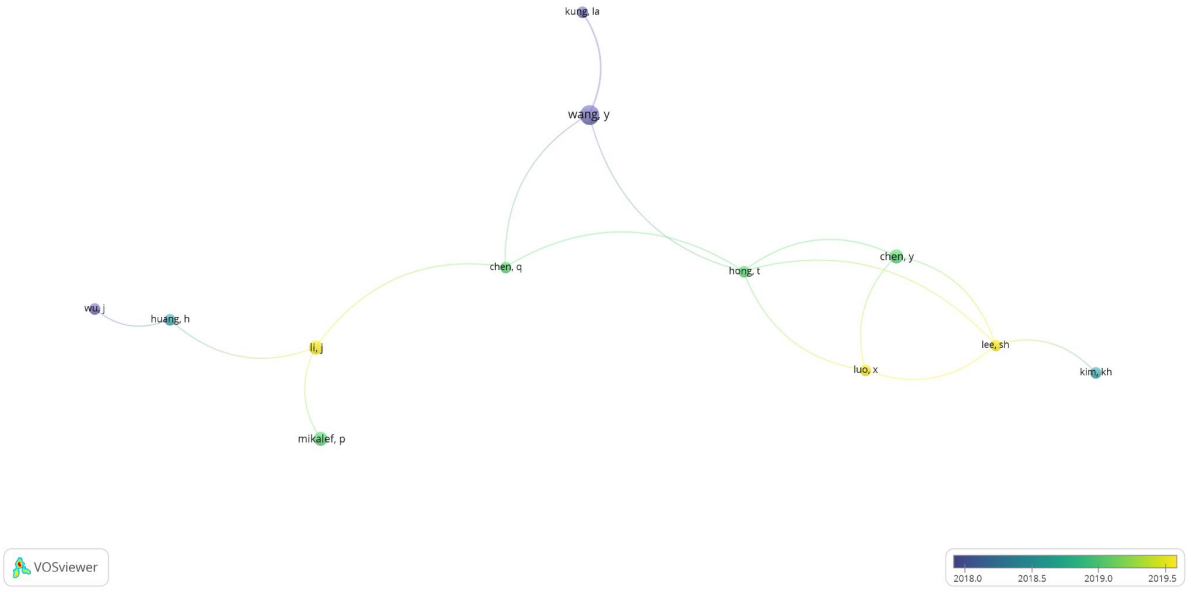

Figure 5. Overlay Visualization of Author Relationship with Authorship in the Database *Google Scholar*

CONCLUSIONS

Taken together, these data allow this paper to answer the question about the research trends in the development of scientific assessment over the last 5 years. Some words that are not used can be related and studied in further research. This study reviews journal articles whose theme is related to the keyword 'developing science analytical thinking assessment'. Articles collected from Google Scholar database with Harzing Publish or Perish software. Then these 107 articles were selected from a larger original set consisting of 324 articles published in the period 2018 to 2022. To fulfill the purpose of this study, all found articles were classified by author, year of publication, name of the publishing journal, citations, author and co-authorship relationships and affiliation statistics. The gaps in this research indicate the direction of the agenda going forward that the development of an assessment based on scientific analysis is very important to study.

REFERENCES

Abell, M. (2006). Individualizing learning using intelligent technology and universally designed curriculum. The journal of technology, learning and assessment, 5(3).

Ad'hiya, E., & Laksono, E. (2018). Development and Validation of an Integrated Assessment Instrument to Assess Students' Analytical Thinking Skills in Chemical Literacy. International Journal of Instruction. http://www.e-iji.net/dosyalar/iji_2018_4_16.pdf

Astuti, SR, Suyanta, Lfx, EW, & Rohaeti, E. (2017). An integrated assessment instrument: Developing and validating an instrument for facilitating critical thinking abilities and science process skills on electrolyte and nonelectrolyte solution matter.https://doi.org/10.1063/1.4983909

Baneyx, A. (2008). "Publish or Perish" as citation metrics used to analyze scientific output in the humanities: International case studies in economics, geography, social sciences, philosophy, and history. Archivum Immunologiae et Therapiae Experimentalis, 56(6), 363–371. https://doi.org/10.1007/s00005-008-0043-0.

Bilik, O., Damar, HT, Ozdagoglu, G., Ozdagoglu, A., & Damar, M. (2019). Identifying trends, patterns, and collaborations in nursing career research: A bibliometric snapshot (1980–2017). Collegians. https://doi.org/10.1016/j.colegn.2019.04.005.

Cai, CW (2018). Disruption of financial intermediation by FinTech: a review on crowdfunding and blockchain. Accounting & Finance, 58(4), 965-992. https://doi.org/10.1111/acfi.12405

Donthu, N., Kumar, S., & Pattnaik, D. (2020). Forty-five years of Journal of Business Research: A bibliometric analysis. Journal of business research, 109, 1-14. https://doi.org/10.1016/j.jbusres.2019.10.039

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, WM (2021). How to conduct a bibliometric analysis: An overview and guidelines. Journal of Business Research, 133, 285-296. https://doi.org/10.1016/j.jbusres.2021.04.070

Donthu, N., Kumar, S., Pattnaik, D., & Lim, WM (2021). A bibliometric retrospection of marketing from the lens of psychology: Insights from Psychology & Marketing. Psychology & Marketing, 38(5), 834-865. https://doi.org/10.1002/mar.21472

Fensham, PJ, & Bellocchi, A. (2013). Higher order thinking in chemistry curriculum and its assessment. Thinking Skills and Creativity, 10, 250-264. https://doi.org/10.1016/j.tsc.2013.06.003

Garza-Reyes, JA (2015). Lean and green-a systematic review of the state of the art literature. Journal of Cleaner Production, 102, 18–29. https://doi.org/10.1016/j.jclepro.2015.04.064

Hudha, MH, Hamidah, I., Permanasari, A., Abdullah, AG, Rachman, I., & Matsumoto, T. (2020). Low carbon education: A review and bibliometric analysis. European Journal of Educational Research, 9(1), 319-329. https://doi.org/10.12973/eu-jer.9.1.319.

Irwanto, Rohaeti, E., LFX, EW, & Suyanta. (2017). The development of an integrated assessment instrument for measuring analytical thinking and science process skills. In AIP Conference Proceedings (Vol. 1847, No. 1, p. 050005). AIP Publishing LLC. https://doi.org/10.1063/1.4983907

Ketterlin-Geller, LR (2005). Knowing what all students know: Procedures for developing universal design for assessment. The Journal of Technology, Learning and Assessment, 4(2).

Khan, MA, Pattnaik, D., Ashraf, R., Ali, I., Kumar, S., & Donthu, N. (2021). Value of special issues in the journal of business research: A bibliometric analysis. Journal of business research, 125, 295-313. https://doi.org/10.1016/j.jbusres.2020.12.015

Kunisch, S., Menz, M., Bartunek, JM, Cardinal, LB, & Denyer, D. (2018). Feature Topic at Organizational Research Methods: How to Conduct Rigorous and Impactful Literature Reviews? Organizational Research Methods, 21(3), 519–523. https://doi.org/10.1177/1094428118770750

Linnenluecke, MK, Chen, X., Ling, X., Smith, TJ, & Zhu, Y. (2017). Research in finance: A review of influential publications and a research agenda.*Pacific-basin Finance Journal, 43*, 188-199. https://doi.org/10.1016/j.pacfin.2017.04.005

Linnenluecke, MK, Marrone, M., & Singh, AK (2020). Conducting systematic literature reviews and bibliometric analyses. Australian Journal of Management, 45(2), 175–194. https://doi.org/10.1177/0312896219877678

Liu, Z., Yin, Y., Liu, W., & Dunford, M. (2015). Visualizing the intellectual structure and evolution of innovation systems research: A bibliometric analysis. Scientometrics, 103(1), 135–158. https://doi.org/10.1007/s11192-014-1517-y

Martinez-Lopez, FJ, Merigo, JM, Gazquez-Abad, JC, & Ruiz-Real, JL (2019). Industrial marketing management: Bibliometric overview since its foundation. Industrial Marketing Management, 84, 19–38. https://doi.org/10.1016/j.indmarman.2019.07.014

Montaku, S., Kaittikomol, P., & Tiranathanakul, P. (2012). The model of analytical thinking skill training process. Research Journal of Applied Sciences, 7(1), 17-20. https://doi.org/10.3923/RJASCI.2012.17.20

Nagy, G. (2018). Text mining-based scientometric analysis in educational research. In Proceedings of the European Conference on Education 2018 (pp. 129–142). Szeged, Hungary: University of Szeged. https://papers.iafor.org/submission42010/

OECD. (2016). PISA 2015 Assessment and Analytical Framework: Science, Reading, Mathematical and Financial Literacy, PISA.

Ongowo, RO, & Indoshi, FC (2013). Science Process Skills in the Kenya Certificate of Secondary Education Biology Practical Examinations. Creative Education, 04, 713-717.*http://dx.doi.org/10.4236/ce.2013.411101*

Opateye, JA. (2012). Developing and Assessing Science and Technology Process Skills (STPSs) in Nigerian Universal Basic Education Environment. Journal of Educational and Social Research, 2(8), 34. https://www.richtmann.org/journal/index.php/jesr/article/view/11988

Pertiwi, Utami Dian; Atanti, Rina Dwik; Ismawati, Riva. (2018). The Importance of Scientific Literacy in 21st Century Middle School Science Learning. Indonesia Journal of Natural Science Education (IJNSE) Vol 1(1):24-29. https://doi.org/10.31002/nse.v1i1.173

Wiguna, IKW and Made ANT (2022). Steps to Accelerate the Development of the Free Learning Curriculum. Education: Journal of Basic Education Vol. 3, No. 1, 2022:17-26.

Santhitiwanich, A., Pasiphol, S., Tangdhanakanond, K. (2013). The integration of indicators of reading, analytical thinking and writing abilities with indicators of subject content. Procedia - Social and Behavioral Sciences, 116, 4854 – 4858. https://doi.org/10.1016/j.sbspro.2014.01.1037

Setyaningsih, I., Indarti, N., & Jie, F. (2018). Bibliometric analysis of the term "green manufacturing". International Journal of Management Concepts and Philosophy, 11(3), 315–339. https://doi.org/10.1504/ijmcp.2018.093500.

Shukla, N., Merigó, JM, Lammers, T., & Miranda, L. (2020). Half a century of computer methods and programs in biomedicine: A bibliometric analysis from 1970 to 2017. Computer Methods and Programs in Biomedicine, 183, 105075. https://doi.org/10.1016/j.cmpb.2019.105075.

Stone, EM (2014). Guiding students to develop an understanding of scientific inquiry: A science skills approach to instruction and assessment. CBE—Life Sciences Education, 13(1), 90-101. https://doi.org/10.1187/cbe-12-11-0198

Subali, B. (2011). Measurement of creativity in science process skills in the context of assessment for learning. Journal of Education Horizon, 1(1). https://doi.org/10.21831/cp.v1i1.4196

Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. British Journal of Management, 14(3), 207–222. https://doi.org/10.1111/1467-8551.00375

van Eck, NJ, & Waltman, L. (2010). Survey software: VOSviewer, a computer program for bibliometric mapping. Scientometrics, 84(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

Waluyati, I. (2012). Evaluation of social science learning programs for SMP/MTs in Bima City. Journal of Educational Research and Evaluation, 16(1), 260-280. https://doaj.org/article/ba492f39f1bd4bacae01333b71333cb2