

Instrument for Student Attitudes Assessment in Science Learning: A Review and Bibliometric Analysis

Submitted 2 April 2023, Revised 14 April 2023, Accepted 15 April 2023

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Abstract

This research aimed to provide a bibliometric study on the keyword "Attitude assessment instrument." The method used in this study is a quantitative method to use metadata harvesting stages using the Publish or Perish (PoP) software from the Google Scholar database. 6 relevant journals have been found out of 97 articles search results in the Google Scholar database. The searches were sorted from 2016 to 2021 and then analyzed in this study. The selected references are used as a database which is then hidden and visualized using the VOSviewer software. In general, this study provides a suitable reference point for further research on the "Attitude assessment instrument."

Keywords: Bibliometric, Attitude Assessment Instrument, Science Learning

INTRODUCTION

Science continues to develop along with the times. This certainly has a positive or negative impact on the world of education and other fields in general (Suryadi, 2013). One of the positive impacts felt in the world of education includes the increasingly diverse content of learning materials that must give to students. However, this positive impact is accompanied by negative impacts, namely with a variety of content, the level of difficulty that students must face is more diverse and higher than before, for example, the content of learning materials for the kindergarten education level when this already includes learning material equivalent to Elementary School level in grade 1. So, educators must have an effective strategy to teach the material content without the impression of burdening students (Akerson et al., 2019; Goode et al., 2010; Rusilowati, 2006; Tambunan, 2016). Because with a lot of content, the delivery of material could be more optimal because we must pursue learning targets according to the curriculum.

Another impact of the times is technological progress (Nafi'ah, 2019; Suryadi, 2013). One of the positive impacts of progress in the field of technology is the increasingly sophisticated means of communication. However, this positive impact is also accompanied by negative impacts, namely, the widespread use of gadgets by various groups regardless of age limit creates new social problems. The impact of using this device is also being felt by the world of education, especially for the age of students at the elementary school and junior high school levels who still cannot filter the swift currents of changes in technological progress—especially with the current condition of the Covid-19 pandemic, forcing us to carry out learning activities online / in the network (online). So that it provides space for students to be able to use their devices longer, and they often misuse them to seek their pleasure, such as playing online games

or opening sites that are not intended for their age. This condition causes students to be lazy to learn, so the desire to explore knowledge decreases drastically, and assignments become neglected.

The tendency of students to freely use these devices impacts their psychological development, affects their attitudes and emotions, and ultimately forms characters that are inherent in everyday life. Seeing this situation, the government assessed Indonesia's education system and decided that it was necessary to make changes to the curriculum. From the results of this study, a new curriculum was born that focused on building students' character, namely the 2013 Curriculum (Anshori, 2003; Nafi'ah, 2019; Prasetyowati, 2014; Risdyanti et al., 2019). Currently, the 2013 Curriculum has been used at various levels of education in Indonesia (Prasetyowati, 2014; Risdyanti et al., 2019). There is no escape from the process of assessing students in the learning process. Assessment is a systematic process that contains information gathering, analyzing, and interpreting this information to make decisions (Zein and Darto, 2012; Mustafa & Masgumelar, 2022; Education et al., 2017).

Assessment in the Curriculum 2013 is carried out authentically and includes three domains, namely cognitive (Knowledge), Psychomotor (Skills), and Affective, based on proportional processes and results, as well as assessment of test results and portfolios that complement each other (Astuti & Darsinah, 2018; Habibah, 2022; Nugroho & Mawardi, 2021; Simarmata et al., 2019; Suryani, 2016). Based on these three assessments, which are often used and already have standard guidelines, are assessments in the cognitive and psychomotor domains, for the affective domain is still not a priority, so educators experience difficulties in conducting affective assessments (Nugroho & Mawardi, 2021; Purba, 2021; Suryani, 2016).

The 2013 curriculum is a curriculum that focuses on building the character of students. This is based on the current situation, where there is a decrease in the positive character of students. Changes in the character of these students, apart from being caused by the progress of the times and technological developments, can also be caused by cultural differences in the surrounding environment, parenting styles, and so on. Thus, character education needs to be implemented to fortify students from negative things due to the progress of the times and to help develop the potential of students in facing the challenges of the times.

Character is closely related to the affective domain, which includes several instruments, one of which is an attitude instrument (Khudaefah & Arlianty, 2020; Setiawan et al., 2020; Triyono et al., 2019; Wahyuni et al., 2019; Yuniwati et al., 2021). Students' attitude during the learning process is very important for an educator to know how to deal with students in class so that learning can be successful. The success of the learning process, especially in the field of

science, is expected to improve the quality of Indonesian human resources, who can explore and utilize abundant natural resources for the progress of Indonesia (Maison et al., 2020).

Attitude is a reaction or response that arises from a person toward an object, giving rise to individual behaviour toward the object in certain ways (Mawardi, 2019). Seeing the importance of the influence of attitudes on learning and the formation of students' character, especially in science learning at the junior high school level, the authors chose the "attitude assessment instrument" as the research theme to develop appropriate attitude assessment instruments to produce students who can compete in the future, especially in the field of science.

We use VOSViewer as a tool to map or find out the position where the research is being carried out among another research that has existed so far. The software can help us distinguish a more specific theme from a big one. We can analyze research gaps from the selected themes to determine opportunities for further research development.

METHOD

Bibliometric analysis is a quantitative technique for assessing the bibliographic data in journal publications. This method is frequently used to map the scientific areas covered by a publication, look up references to scientific papers mentioned therein, and classify scientific articles by research domain. This method can be applied in sociology, the humanities, communication, marketing, and other social groups. The bibliometric analysis uses a citation analysis approach and a co-citation analysis approach to identify two or more publications that are cited by a single article. We need software that can be used to analyze data while looking at bibliometrics. VOSViewer Software is one tool that can make it easier to analyze bibliometric data. The stages in the bibliometric analysis can be seen in Figure 1.

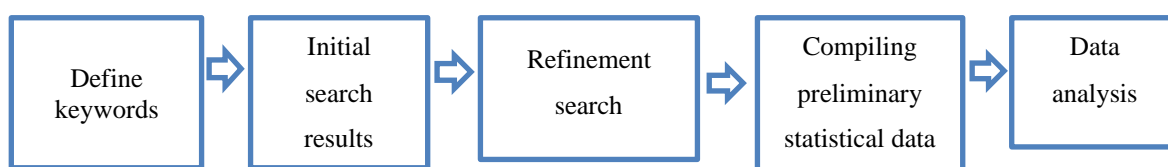


Figure 1. Bibliometric analysis stages

A literature search was conducted in November 2021 using the "attitude assessment instrument." Google Scholar was chosen because it is currently the largest database, and Publish or Perish was chosen because it has proven to be the most effective way to harvest large amounts of metadata. This search is specifically for journal articles, using the keyword "attitude assessment instrument" The search year is limited from "2016–2021", with a maximum desired number of 100 metadata. The data is gathered in a Research Information Systems (RIS) format,

which includes all crucial article data like the title of the paper, the name and affiliation of the authors, the abstract, the keywords, and the references.

The Google Scholar database is filtered to only show matched and indexed articles. This information excludes journal-only selected articles from proceedings, newspapers, books, book reviews, and book chapters. The file is then saved as a RIS file so that the necessary repairs can be made. The RIS data was imported into the bibliographic program VOSViewer. Further data analysis was performed using the generated RIS files. The RIS form is used to store the obtained data. First, the entire journal article is examined, including the year of publication, volume, number of pages, etc. Data analysis was done so that papers could be grouped by publisher, year of publication, and source of publication.

In this study's bibliometric analysis, PoP software is used. However, use the VOSViewer program (Eck & Waltman, 2011; Jan & Ludo, 2010; Yu et al., 2020) to study and display the bibliometric network. Because it can handle big data sets and offers a wide range of fascinating graphics, analysis, and investigations, VOSViewer is employed. Additionally, VOS Viewer may produce keyword maps based on shared networks or publication, author, or journal maps based on co-citation networks.

RESULTS AND DISCUSSION

The results of comparing metadata metrics using the Publish or Perish software from the Google Scholar database based on the keyword "attitude assessment instrument" can be seen in Table 1.

Table 1. Metric Comparison

<i>Metrics data</i>	<i>Initial search</i>	<i>Refinement search</i>
Source	<i>"attitude assessment instrument"</i>	<i>"Attitude assessment instrument"</i>
Publication year	2016 - 2021	2016 - 2021
Papers	100	97
Citations	850	850
Cites/year	170,00	170,00
Cites/paper	8,50	8,76
Authors/paper	3,10	3,09
h-index	14	14
g-index	28	28
hI-norm	8	8
hI-annual	1,60	1,60
hA-index	9	9

Previous research on the attitude assessment instrument has been carried out, among others, by Ali (2020), who implemented an evaluation of the affective domain of students in 2013 Curriculum-based learning at MTs Negeri 2 Kotamobagu with the results obtained that the implementation of evaluation of the affective domain at MTs Negeri 2 Kotamobagu has

generally been carried out but not yet maximum, the problem of evaluating the affective domain at MTs Negeri 2 Kotamobagu is that the teacher does not understand well about the measurement of the student's affective domain, so the assessment is only based on observations in class, without any notes on student attitudes during learning. The solution to evaluating students' affective domain at MTs Negeri 2 Kotamobagu is related to evaluation techniques, so the head of the madrasah instructs the teacher to make an attitude evaluation report. This research is in line with that carried out by Defina and Hairida (2022), who developed self- and peer-based affective assessment instruments in organic chemistry practicum, with the results of the research stating that self- and peer-based affective assessment instruments were very appropriate to use. Retnowati (2019) also developed an affective domain assessment instrument (attitude) of responsibility for students. This study aims to determine how teachers measure students' attitudes of responsibility, develop standard/appropriate instruments to measure students' responsible attitudes and know the tendency of the attitude of responsibility of students of SMP Negeri 2 Gamping with the resulting questionnaire model measuring instrument. Apart from this research, many previous studies are still related to attitude assessment instruments.

From the metadata harvested in the PoP, it can be seen that articles have high citations. Fourteen articles have high citations; these articles can be seen in Table 2.

Table 2. Articles with the highest citations.

No	Publication Year	Author	Title	Journal	Cites
1	2016	H Retnawati, S Hadi, AC Nugraha	<i>Vocational High School Teachers' Difficulties in Implementing the Assessment in Curriculum 2013 in Yogyakarta Province of Indonesia</i>	<i>International Journal of Instruction</i>	220
2	2017	W Maba	<i>Teachers' Perception on the Implementation of the Assessment Process in 2013 Curriculum</i>	<i>International Journal of Social Sciences and Humanities</i>	103
3	2018	K Komalasari, D Saripudin	<i>The Influence of Living Values Education-Based Civic Education Textbook on Students' Character Formation</i>	<i>International Journal of Instruction</i>	54
4	2016	JA Ritchotte, Diana Suhr,	<i>An Exploration of the Psychosocial Characteristics of High Achieving</i>	<i>Journal of Academic Advanced</i>	45

No	Publication Year	Author	Title	Journal	Cites
		NF Alfurayh	<i>Students and Identified Gifted Students: Implications for Practice</i>		
5	2018	E Misaki, M Apiola, Silviani Gaiani, Matti Tedre	<i>Challenges facing sub-Saharan small-scale farmers in accessing farming information through mobile phones: A systematic literature review</i>	<i>The Electronic Journal of information system and developing countries</i>	32
6	2019	D Asmelash, N Abdi, S Tefera, HW Baynes, Cherie Derbew	<i>Knowledge, Attitude, and Practice towards Glycemic Control and Its Associated Factors among Diabetes Mellitus Patients</i>	<i>Journal of Diabetes research</i>	31
7	2017	AH Saleem, FA Al Rashed, GA Alkarboush, OM Almazyed, AH Olaish, AS Almeneessier, AS Bahamam	<i>Primary care physicians' knowledge of sleep medicine and barriers to transfer of patients with sleep disorders</i>	<i>Saudi medical Journal</i>	27
8	2018	M Melku, F Asrie, E Shiferaw, Berhanu Wordu, Yalelet Yehunew, Daniel Asmelash, Bamlaku Enawgaw	<i>Knowledge, Attitude and Practice Regarding Blood Donation among Graduating Undergraduate Health Science Students at the University of Gondar, Northwest Ethiopia</i>	<i>Ethiopian Journal of Health Sciences</i>	24
9	2019	S Adnan	<i>Teacher Competence in Authentic and Integrative Assessment in</i>	<i>International Journal of Instruction</i>	23

No	Publication Year	Author	Title	Journal	Cites
10	2017	V Somaraj, RP Shenoy, GS Panchmal, PS Jodalli, L Sonde, R Karkal.	<i>Indonesian Language Learning Knowledge, attitude and anxiety pertaining to basic life support and medical emergencies among dental interns in Mangalore City, India</i>	<i>Word Journal of Emergency Medicine</i>	22
11	2016	RL Isacson, MB Isacson, KJ Plumer, SB Chapman	<i>Development and Validation of the Isacson Survey of Academic Reading Attitudes (ISARA)</i>	<i>Journal of collage reading and learning</i>	19
12	2016	CA Shamkuwar , N Kumari, SH Meshram, GN Dakhale, VM Mothgare	<i>Evaluation of Knowledge, Attitude and Medication Adherence among Asthmatics Outpatients in Tertiary Care Teaching Hospital-A Questionnaire Based Study</i>	<i>J Young Pharm</i>	16
13	2019	DP Sari, H Rifai	<i>Preliminary analysis of edupark fluid learning tool in Mifan water park in Padang Panjang city</i>	<i>Journal of Physics</i>	16
14	2019	VJ Anggara, H Rifai	<i>The preliminary analysis of Edupark learning devices of temperature and heat physics of Air Panas Semurup Kerinci District</i>	<i>Journal of Physics</i>	15

Table 2 shows that the article with the most citations is about the Difficulties of Vocational School Teachers in Implementing the Curriculum 2013 Assessment in the Province of Yogyakarta Special Region. This shows that implementing assessments in schools is experiencing problems because teachers need to fully understand the assessment system, including developing attitude instruments, implementing authentic assessments, formulating

indicators, designing rubrics for skills assessment, and collecting scores from several technical measurements. In addition, teachers cannot find appropriate applications to describe student achievement (Retnawati et al., 2016). Journals that have relevant articles are presented in Table 3.

Table 3. Relevant journals and articles

No.	Journal	Total Articles	Cities
1	International Journal of Social Sciences and Humanities	25.75	103
2	Journal of Humanities and Social Studies	7.00	14
3	International Journal of Education and Development Using	4,5	9
4	Indonesian Journal Of Educational Research And Review	0.5	1
5	International Journal of Instruction	44.00	220
6	Journal of inovatif Science Education	0,00	0

Based on Table 3, the International Journal of Instruction is the journal that has the most relevant articles to the attitude assessment instrument and has the highest citation. The visualization display of the data network on the Google Scholar database related to the keyword "attitude assessment instrument" which has been refined in the search, can be seen in Figure 2. The overlay visualization can be seen in Figure 3, and the density visualization in Figure 4.

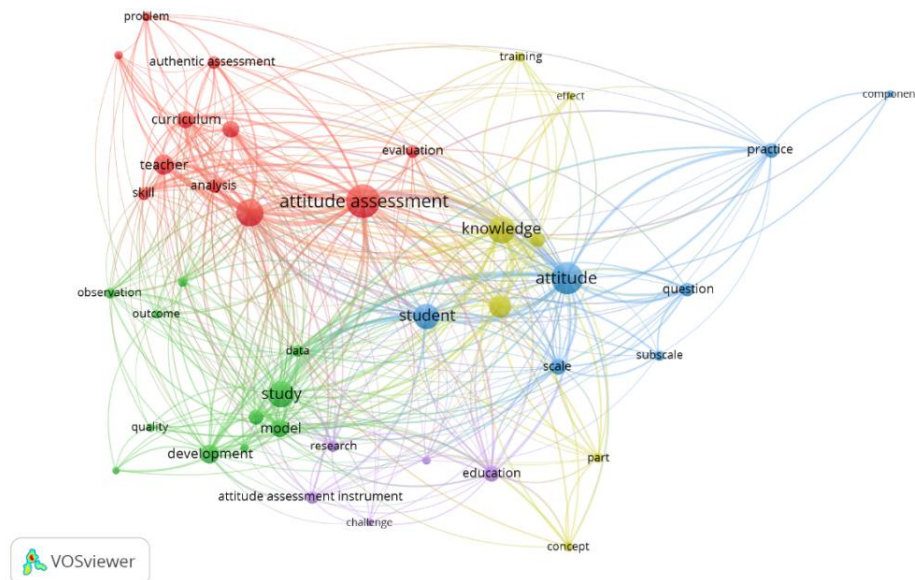


Figure 2. Network visualization on the Google Scholar database

Based on Figure 2, 42 items, 5 clusters, 429 links, and a total link strength of 2080 are obtained. The keyword most connected with the "attitude assessment instrument" is "attitude assessment" itself. This can be seen from the size of the node, which is the largest among the others, has thick links, and is in the first cluster (red). This shows that "attitude assessment" is often researched by researchers. The keyword "attitude assessment instrument" is in the fifth cluster (purple) with a slightly smaller node size than the keyword "attitude assessment" but still has a thick link. The link relates to other keywords: development, instrument, study, assessment, analysis, implementation, challenge, research, education, effectiveness, student, tool, and attitude. The keywords that appear in each cluster with the largest node size representing the study flow in the attitude assessment can be seen in Table 4.

Table 4. Keywords that describe each Cluster

No.	Cluster	Element
1	First Cluster (red)	Attitude Assessment (39)
2	Second Cluster (green)	Study (33)
3	Third Cluster (blue)	Student (33), Attitude (38)
4	Forth Cluster (yellow)	Knowledge (32)
5	Cluster kelima (grey)	Education (27), attitude assessment instrument (15)

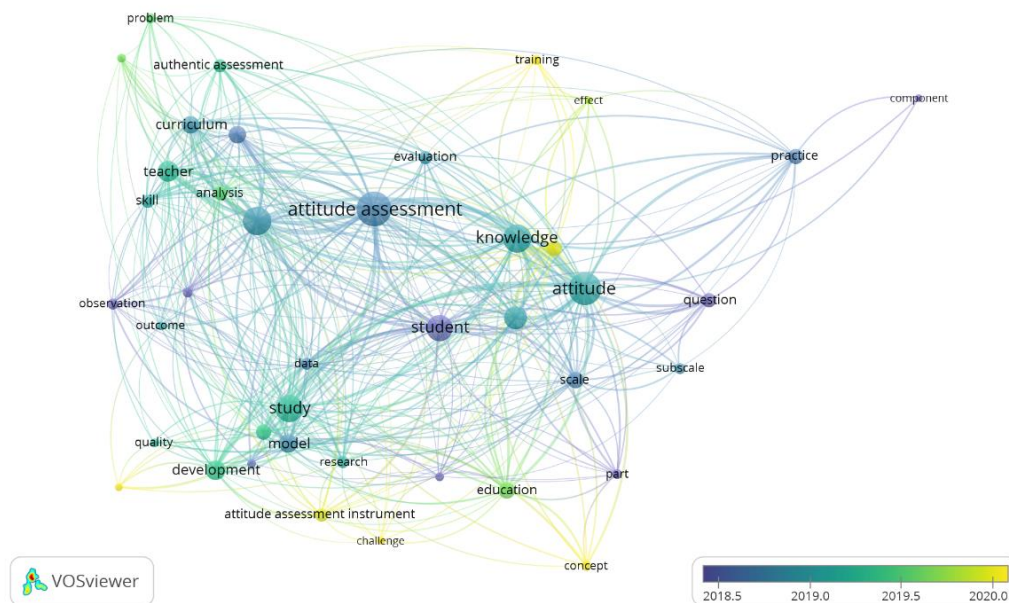


Figure 3. Overlay visualization on the Google Scholar database

Based on Figure 3, it can be seen the novelty of a research topic. The relationship between color and year indicates this. Recent research is shown in yellow (attitude assessment instrument, concept, effect, training).

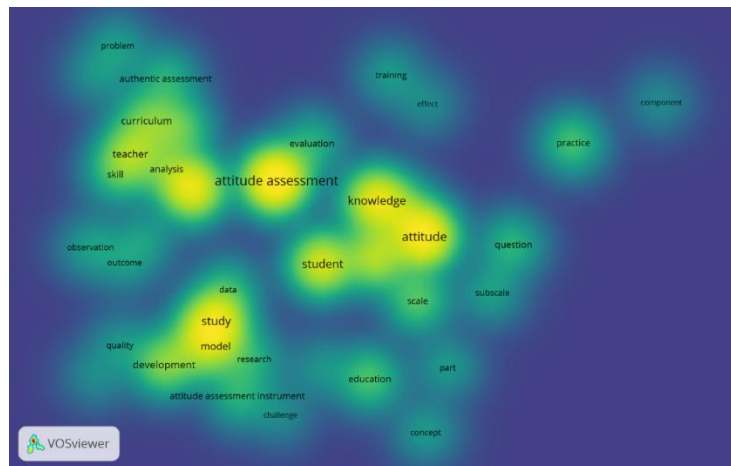


Figure 4. Visualization of density in the Google Scholar database

Density Visualization can be seen in Figure 4. In this figure, the bright yellow indicates the keywords that have been researched the most, whereas the yellow color is dim, and the nodes are small, meaning there is still little research related to these keywords. Based on Figure 4, "attitude assessment" is a keyword often studied in research.

CONCLUSION

The study's most influential contribution is evidenced by its high number of citations. According to Google Scholar, the article about the challenges faced by Indonesia's Yogyakarta Province's vocational high school instructors in 2016 in implementing the assessment in the curriculum for 2013 had the most citations. The Curriculum 2023, which has been adopted in some Indonesian schools from July 2013 and may have been implemented in all schools around 2014, poses challenges for vocational school teachers when it comes to conducting assessments. More than 220 academic articles were cited in this article. ERIC, with 44 citations, is the publication with the highest number of citation frequencies according to the statistics.

The number of articles for each publisher was also looked at in relation to the significance of the magazine. The results were compiled from the top 6 journal articles that address this subject. The key concepts in each subject of study or area of competence are identified through the examination of overlay visualization and density visualization. The findings came from assessing the frequency of keyword pairs. The VOSViewer application is used to conduct the analysis. These findings show how each cluster relates to other terms and how the evolution of the field's body of knowledge is related.

The phrase "attitude assessment" is the one that best describes this theme. When the information is considered as a whole, the researcher can respond to the inquiry of what study patterns have been present in attitude assessment throughout the previous five years. Future

research can link and examine some words that are not used. In order to provide a more detailed analysis, numerous other subjects can be created based on keywords like study, curriculum, student, attitude, knowledge, and education.

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