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Bibliometric Analysis of High School Keyword Using VOSviewer Indexed by Google Scholar

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ABSTRACT

Schools are institutions designed for the learning process. The school level is divided into basic education, secondary education, and higher education. The purpose of the school is to develop the potential of students. The purpose of this research is to combine mapping analysis with the VOSviewer application. In addition to VOSviewer, Publish or Perish was also carried out in this study. The keyword used is "High School". Based on search results of 1000 relevant articles published from 2017-2021. Based on the research results, the number of published articles about "high school" has decreased every year. This research is expected to help researchers who will conduct and determine the research theme.

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1. INTRODUCTION

A school is an institution designed for student learning under the supervision of educators (Apple & King, 1977). Most countries have formal education systems to create knowledgeable and insightful students. In addition, formal education is one of the factors of socio-economic development (Sawyer & Korotayev, 2021). The purpose of the school is to develop the potential of students to become human beings who believe, have a noble character, are knowledgeable, capable, creative, independent, and become democratic and responsible citizens (Nurdyansyah, 2017).

Formal education is a structured and tiered educational path consisting of basic education, secondary education, and higher education (Ishak *et al.*, 2020). Basic education is the initial level of education before entering the secondary and higher education levels. Secondary education is divided into two, namely junior secondary education and senior secondary education. Secondary education is the level of further education for basic education (Bell *et al.*, 2017). High school is included in secondary education. Secondary school or high school is an educational unit after junior high school and the equivalent that prioritizes students' theoretical abilities. Secondary school is a requirement for students who will continue their education to a higher level or higher education (Bell *et al.*, 2017).

Many studies on high school have been carried out, including research on learning methods in high schools (Abidin *et al.*, 2019; Anggraeni *et al.*, 2020a; Anggraeni *et al.*, 2020b; Azizah *et al.*, 2021). pandemic in high school (Hernawati *et al.*, 2021; Powless *et al.*, 2020; Schellen *et al.*, 2017) and other studies. Although research on high school has been widely carried out, research on bibliometric analysis of high school is still rarely studied. Therefore, we chose to research bibliometric analysis with the keyword "High School".

This study aims to conduct bibliometric research of high school by combining the results of mapping using VOSviewer software. This research is expected to help and become a reference for researchers in conducting and determining the research topics to be taken, especially those related to high school.

2. METHOD

The article data used in this study is research data from articles that have been published in journals that have been indexed by Google Scholar. The use of Google Scholar is because Google Scholar can be accessed for free. In addition to using Google Scholar, you can also use the Scopus database, but using Scopus is paid because it is a little difficult to access. However, we will use the Scopus database in our next study. The Publish or Perish application is used in data management. Detailed information about VOSviewer and library search has been described in the research conducted by Al Husaeni and Nandiyanto (2022).

The keyword "High School" is used to search for published or published data according to the title, keywords, and abstract criteria. Thus, 1000 articles were obtained which were assessed according to the chosen topic. The articles taken are articles published in 2017-2021. The collected articles are then saved in *.ris format. Furthermore, the data is visualized and analyzed in the form of a bibliometric map. Data from the database source that has been prepared is then mapped in 3 forms, namely network visualization, overlay visualization, and density visualization.

3. RESULTS AND DISCUSSION

3.1. Research Development in the Field of High School

Figure 1 depicts the high school keyword research curve from 2017 to 2021. The development of research on high school has decreased over the last 5 years. The decrease can be seen from the shape of the curve. In 2017 there were 496 articles published. In the following year, 2018, the number of articles about high school decreased significantly, namely as many as 222 articles, so that in 2018 the number of articles about high school was 274 articles. Likewise, in the following year, 2019 it fell to 113 articles, in 2020 it became 79 articles and in 2021 it became 38 articles.

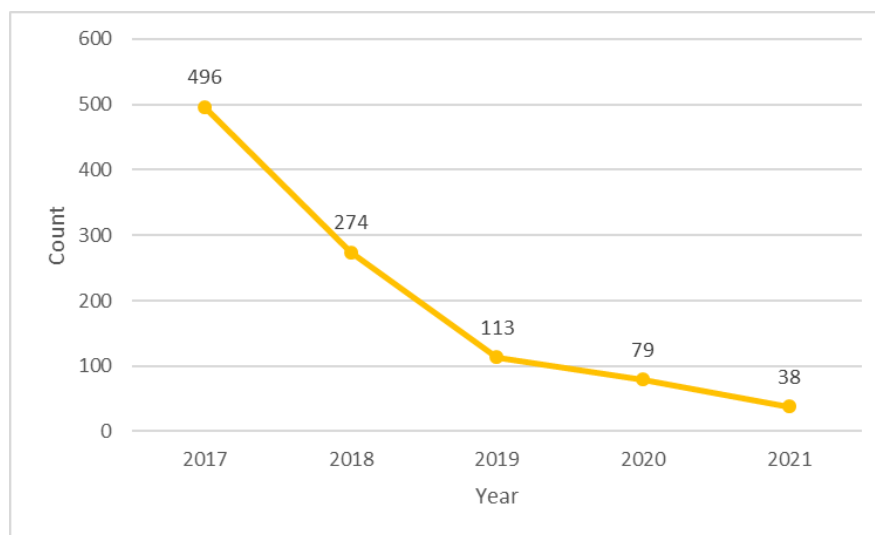


Figure 1. Developmental level of research on high school.

3.2. Clusters Resulting from the VOSviewer Mapping with the Keyword of High School

The minimum number of relationships between terms in VOSviewer is set by two terms (Nandiyanto & Al Husaeni, 2021). The number of clusters obtained from the VOSviewer mapping with the keyword high school is 5 clusters. Each of these clusters has a different number of items, different item types, and different cluster colors. From each item in the cluster formed in a circle, the circle has a different size. The size of the circle is determined by the frequency with which it occurs (Mulyawati & Ramadhan, 2021). The bigger the circle, the more often the keyword is used, and the smaller the circle, the less often the keyword is used.

The five clusters obtained from the results of the VOSviewer mapping with the keyword high school are as follows:

- (i) Cluster 1 which is marked in red has 54 items (see **Figure 2**), the 54 items are ability, academic achievement, academic performance, achievement, activity, addition, analysis, attitude, college student, course, data, development, effect, effectiveness, elementary school, example, grade, high school graduation, high school student, high school teacher, higher education, importance, Indonesia, instance, junior high school, junior high school student, knowledge, learning, longitudinal study, mathematics, middle, middle school, model. Need, perception, practice, primary school, problem, program, relationship, research, review, school, school year, self, self-efficacy, senior high school, skill, strategy, student, subject, teacher, teaching, and technology.

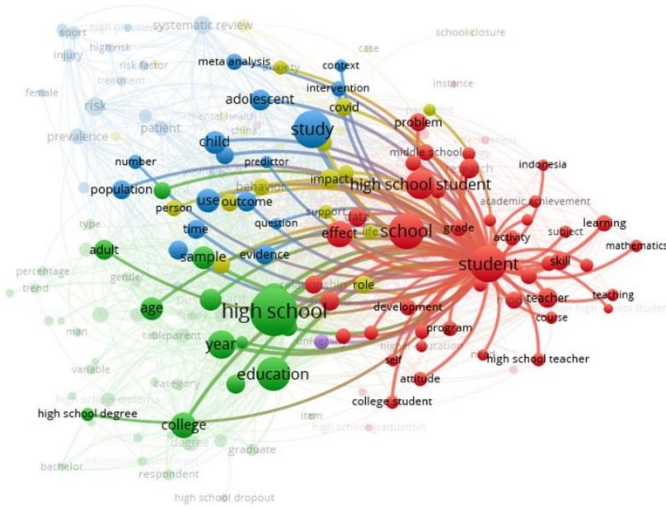


Figure 2. Network visualization of student term in cluster 1.

- (ii) Cluster 2 which is marked in green has 47 items (see **Figure 3**), the 47 items are adult, age, bachelor, black, category, college, college degree, degree, difference, education, education level, educational attainment, experience, family, gender, graduate, group, half, health, high school, high school degree, high school diploma, high school dropout, high school education, high school graduate, individual, item, level, majority, man, mother, parent, participant, percent, percentage, respondent, response, sample, sex, socioeconomic status, table, trend, type, united states, variable, woman and year.

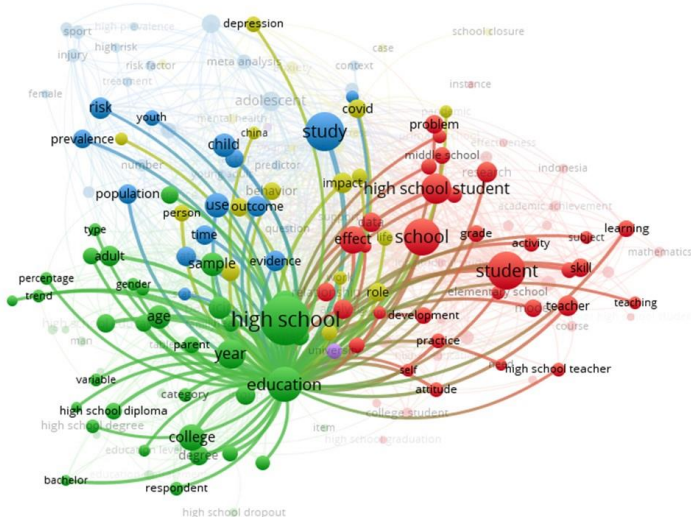


Figure 3. Network visualization of education term in cluster 2.

- (iii) Cluster 3, which is marked in dark blue has 36 items (see **Figure 4**), the 36 items are access, adolescent, child, concussion, context, country, evidence, factor, female, girl, high prevalence, high risk, high school athlete, injury, intervention, meta-analysis, number, outcome, patient, population, predictor, prevalence, question, rate, risk, risk factor, sport, state, study, systematic review, time, treatment, united states, use, young adult, and youth.

3.3. Visualization High School Topic Area Using VOSviewer

VOSviewer can display three different visualization forms, namely: Network visualization (Figure 7), Overlay Visualization (Figure 8), and Density Visualization (Figure 9). Relationships in network visualization are described in a network or line that comes from one term to another.

Figure 7 shows the clusters of each of the researched topic areas in the form of network visualization. The keyword used in this study is "High School" which is in cluster 2 which is marked in green as described in point 3.1. regarding cluster division.

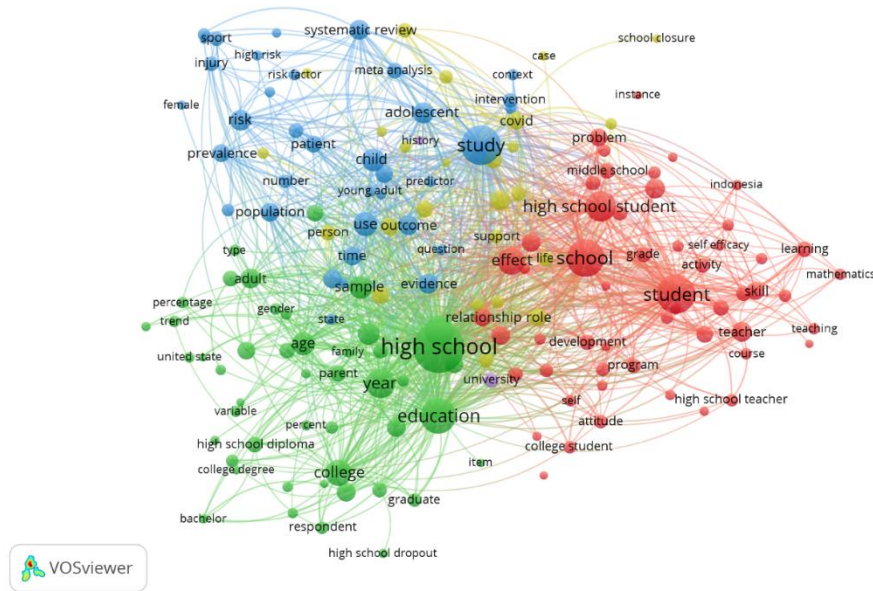


Figure 7. Network Visualization of High School Keyword.

Figure 8 shows the shape of the overlay visualization. In this type of visualization, we can see the year that research is often done on the keywords we are looking for. In Figure 8 we can see that the keyword "High School" was widely researched in late 2017 - early 2018.

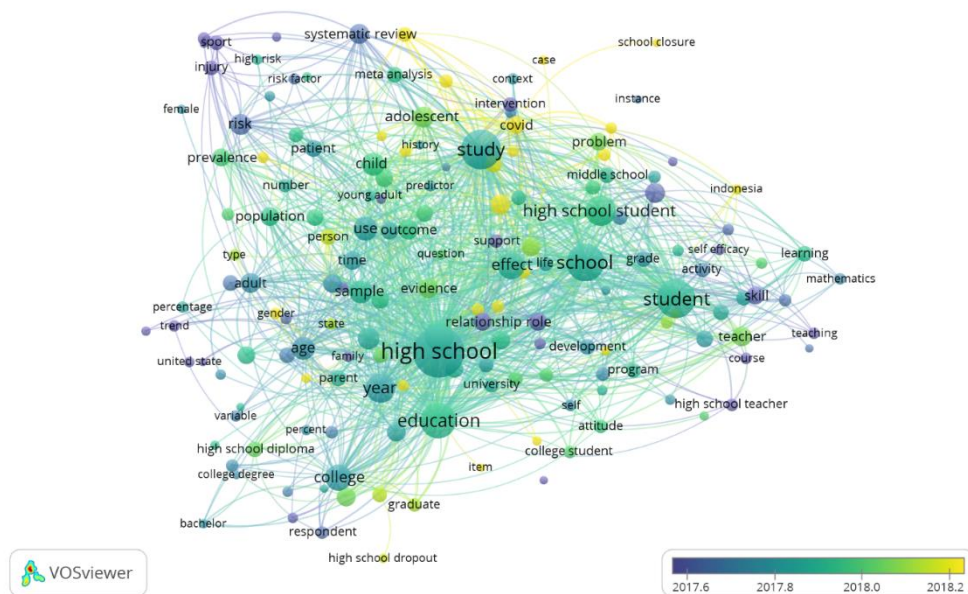


Figure 8. Overlay Visualization of High School Keyword.

Figure 9 shows the shape of the density visualization. In this density visualization, we can see how often or infrequently the keywords that will be used such as "High School" are researched. The indicator that determines how often the keyword is researched is the color contained in the term. The darker or clearer the color, the more often the term is studied and the dimmer the color, the less often the term is studied.

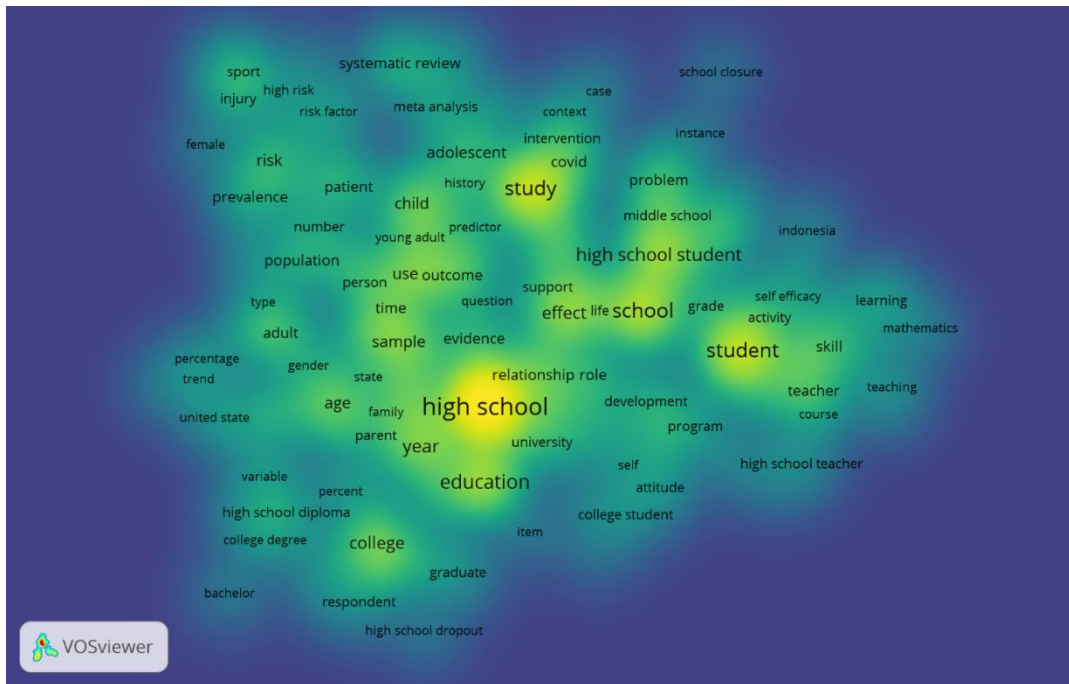


Figure 9. Density Visualization of High School Keyword.

3.4. Search Result Data Using Publish and Perish with The Keyword High School

In the publish or perish application, we can find out some data information as shown in **Table 1** below.

Table 1. Citation of high school publication data.

Description	Data
Publication years	2017-2021
Citation years	5(2017-2022)
Papers	1000.00
Citations	153298.00
Cites/year	30659.60
Cites/paper	153.30
Authors/paper	3.30
h-index	192.00
g-index	300.00
hl, norm	107.00
hl, annual	21.40
hA-index	85.00

In addition to the data above, the results of searching the databases of several journals obtained several data articles that meet the research criteria. Of the 1000 articles obtained, there are 20 articles with the highest number of citations as shown in **Table 2** below.

Table 2. Examples of articles with the most citations based on the keyword high school.

No.	Cites	Authors	Title	Year	Source
1	3289	Siegel et al. (2017)	Colorectal cancer statistics, 2017	2017	CA: a cancer journal for clinicians
2	2706	McCrorry et al. (2017)	Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016	2017	British journal of sports medicine
3	2125	Blau and Kahn (2017)	The gender wage gap: Extent, trends, and explanations	2017	Journal of economic literature
4	1452	Deming (2017)	The growing importance of social skills in the labor market	2017	The Quarterly Journal of Economics
5	1107	Mazza et al. (2020)	A nationwide survey of psychological distress among Italian people during the COVID-19 pandemic: immediate psychological responses and associated factors	2020	International journal of environmental research and public health
6	1073	Credé et al. (2017)	Much ado about grit: A meta-analytic synthesis of the grit literature.	2017	Journal of Personality and Social Psychology
7	966	Lusardi and Mitchell (2017)	How ordinary consumers make complex economic decisions: Financial literacy and retirement readiness	2017	Quarterly Journal of Finance
8	872	Loades et al. (2020)	Rapid systematic review: the impact of social isolation and loneliness on the mental health of children and adolescents in the context of COVID-19	2020	Journal of the American Academy of Child & Adolescent Psychiatry
9	842	Auerbach et al. (2018)	WHO world mental health surveys international college student project: prevalence and distribution of mental disorders.	2018	Journal of abnormal psychology
10	829	Purwanto et al. (2020)	Studi eksploratif dampak pandemi COVID-19 terhadap proses pembelajaran online di sekolah dasar	2020	EduPsyCouns: Journal of Education, Psychology and Counseling
11	814	Darling-Hammond (2017)	Teacher education around the world: What can we learn from international practice?	2017	European journal of teacher education

Table 2 (continue). Examples of articles with the most citations based on the keyword high school.

No.	Cites	Authors	Title	Year	Source
12	806	Ahmed <i>et al.</i> (2020)	Epidemic of COVID-19 in China and associated psychological problems	2020	Asian journal of psychiatry
13	782	Elhai <i>et al.</i> (2017)	Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression	2017	Journal of affective disorders
14	695	Layden <i>et al.</i> (2020)	Pulmonary illness related to e-cigarette use in Illinois and Wisconsin	2020	New England Journal of Medicine
15	683	Sheth (2020)	Impact of Covid-19 on consumer behavior: Will the old habits return or die?	2020	Journal of business research
16	662	Florence <i>et al.</i> (2018)	Medical costs of fatal and nonfatal falls in older adults	2018	Journal of the American Geriatrics Society
17	641	Danielson <i>et al.</i> (2018)	Prevalence of parent-reported ADHD diagnosis and associated treatment among US children and adolescents, 2016	2018	Journal of Clinical Child & Adolescent Psychology
18	594	Mertens <i>et al.</i> (2020)	Fear of the coronavirus (COVID-19): Predictors in an online study conducted in March 2020	2020	Journal of anxiety disorders
19	592	Zhang <i>et al.</i> (2020)	Suspending classes without stopping learning: China's education emergency management policy in the COVID-19 outbreak	2020	Journal of risk and financial management
20	582	Fiolet <i>et al.</i> (2018)	Consumption of ultra-processed foods and cancer risk: results from NutriNet-Santé prospective cohort	2018	BMJ

4. CONCLUSION

The purpose of this research is to combine the VOSviewer high school software. The publish or perish reference manager tool was used to collect data in this study. The information received is filtered using the keyword "High School". Topic, Title, Keyword, and Abstract are one of the bibliographic data used in this study. We found 1000 relevant articles published from 2017 to 2021. The result of this study is that the number of articles published from 2017-2021 regarding secondary schools has decreased every year. Some of the articles obtained have been cited in more than 1000 citations. A search with the High School keyword resulted in five clusters, each cluster having a different number of items. Each classification is

marked by a circle with a different color. The size of the circle often indicates whether or not the term is used.

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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