SETS Instrument: to Investigate Statistics's Teaching Self Efficacy

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ABSTRACT

This study examines the development of research on the topic of using mobile payments, e-wallets. The study aims to find out:: (1) how many international scientific publications have developed the topic self-efficacy in teaching statistics from 2013-2023; (2) how many core journals develop the topic self-efficacy in teaching statistics; and (3) how to map the development of international scientific publications that study the topic self-efficacy in teaching statistics based on keywords (co-words). Data collection by searching through Google Scholar with the word teaching statistics self efficacy, self efficacy to teach statistics and preservice secondary mathematics teachers, with the categories of article title, abstract, keywords in the period 2013 – 2023. Data in the form of the number of publications per year, journals that contain articles teaching statistics self efficacy, self efficacy to teach statistics and preservice secondary mathematics teachers, and subjects were analyzed using Microsoft Excel. Meanwhile, topic mapping trends were analyzed using VosViewer software. The results showed that the highest growth development in 2013 - 2023 indexed on Scopus occurred in 2021 which reached 36 publications. Most international publications are published in journalsTaylor & Francis. Journals52 articles. The research results show that-word research development on self-efficacy in teaching statistics as shown by the density map which is the result of an analysis carried out on all articles related to self-efficacy in teaching statistics from 2013 to 2023. For further research, the authors suggest that it is necessary to add keywords so that more research results are more accurate and comprehensive.

Keywords*: Bibliometrics; Self-Efficacy; Teaching Statistics; Vosviewer*

INTRODUCTION

In the past, the teaching of statistics was not considered important in the college curriculum talland when it is taught, it is taught in the abstract, there is no application in everyday life. In addition, in the current information age, many things are reported to the public in a clear, unrestricted manner, and difficult for many people to interpret. This is due to the inability to understand statistical information and makes some people skeptical of any information that appears ((Rumsey, 2002). Despite the importance of this statistical literacy as a life skill, in the research conducted(Schield, 2008)that given the choice, students at the university level would not take a statistics course unless it was mandatory.

A literature review is needed to gain a better understanding ofthe importance of statistical literacy and the things that influence the development of statistical literacy in education, one of which is self-efficacy in teaching statistics. The aim of this review is to obtain more information about the factors that influence success in teaching statisticBibliometric analysis was used to evaluate research findings and mapped outfieldscience, track and track the development of new knowledge in a

particular field. Bibliometric indicators are calculated over a certain period of time and generally use two approaches: number of publications and productivity indicators; and the number of citations and citations, used in international publications. In 1969, Pritchard and Nalimov and Mulchenko introduced bibliometrics and scientometrics. Pritchard describes bibliometrics as a technique that applies mathematics and statistics to books and other communication media, and Nalimov and Mulchenko describe scientometrics as a qualitative method that focuses on the analysis of science as an information process. Bibliometrics is a collection of statistical and mathematical techniques used to assess and measure the quantity and quality of books, articles and publications. Researchers often use combined mapping and clustering techniques when analyzing bibliometric networks. However, the concepts and ideas underlying the use of mapping and clustering techniques are usually quite different. An integrated approach to bibliometric network mapping and clustering suggests that the VOSviewer technique and the parameterized and weighted variant of modularity-based clustering can both derive from the same principles. This method generates a mapping and grouping of the most frequently cited publications over a certain period of time. An integrated approach to bibliometric network mapping and clustering suggests that the VOSviewer technique and the parameterized and weighted variant of modularity-based clustering can both derive from the same principles. This method generates a mapping and grouping of the most frequently cited publications over a certain period of time. An integrated approach to bibliometric network mapping and clustering suggests that the VOSviewer technique and the parameterized and weighted variant of modularity-based clustering can both derive from the same principles. This method generates a mapping and grouping of the most frequently cited publications over a certain period of time. The purpose of this study is to answer three questions: (1) how many international scientific publications have developed the topicconfidence (self-efficacy) in teaching statistics from 2013- 2023; (2) how many core journals develop the topicconfidence (self-efficacy) in teaching statistics; and (3) how to map the development of international scientific publications that study the topicself-efficacy in teaching statistics.

LITERATURE REVIEW

a. Bibliometrics

According to Glenisson in(Effendy et al., 2021)The bibliography has three sections: a) bibliometrics for bibliometrics, which is a key area of bibliometric research and is traditionally used as a research methodology; b) bibliometrics for scientific fields (scientific information), because researchers work scientifically and have a strong interest in their field of specialization and allow for a border between quantitative search and scientific inquiry.

Bibliometric analysis is a quantitative method for analyzing bibliographic data in articles or journals. This method is usually used to check references to scientific articles cited in journals, map scientific fields of journals, and classify scientific articles according to research fields. Social fields such as sociology, communication, marketing, and other sciences can use this technique. In bibliometric analysis, two approaches are used: citation analysis to identify one article cited by another; and co-citation analysis to identify two or more articles cited by one article.

Shared words, also known as "co-words", denote the scientific concepts contained in a document. Co-word analysis is based on examining the similarity of words or keywords from two or more documents used to index the document

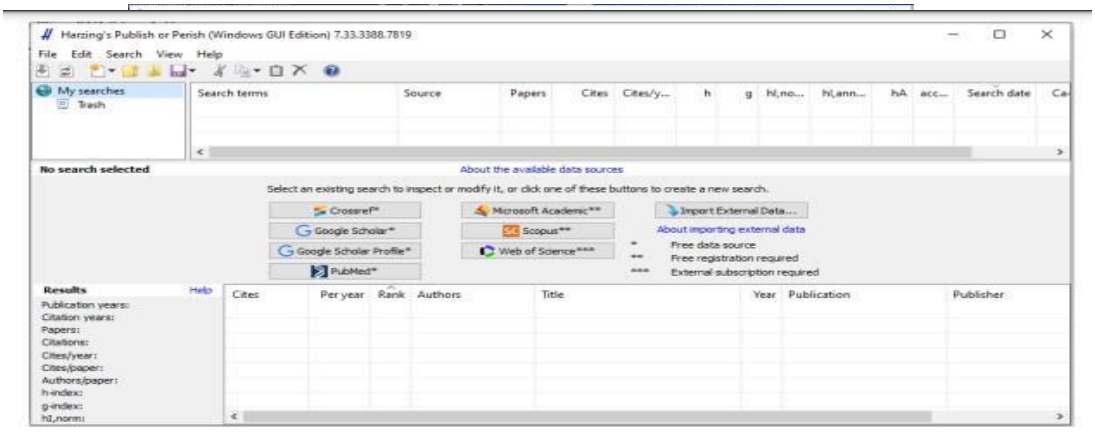
b. Bibliometrics with VosVIEWER

The software called Vosviewer is intended for building and visualizing bibliometric networks. For example, these networks can consist of individual journals, researchers, or publications, and can be built on citations, bibliographical merges, co-citations, or co- authorship links. VOSviewer also has text mining capabilities, which allow you to build and visualize co-occurrence networks of key terms drawn from scientific literature. Measuring the novelty of a study and analyzing the current position of the research are becoming very popular(Tri Wahyuningtyas et al., 2021). VOSViewer has many features that make it easy to view and understand relationships by displaying extensive bibliometric maps. Its features include the ability to perform various types of bibliometric analysis, supports multiple bibliographic databases, removes the time dimension, is limited to analysis of small to medium sized data, is intended for text processing, uses layout and cluster techniques, and uses overlay and density visualization features.

METHOD

Preparation of Analysis Tools

In order to perform data analysis with VOSViewer, we need to create some application first. The first is the mapping tool, which can be accessed via the open-source application VOSViewer (Figure 1). In this research, VOSViewer is used as a tool that allows to display the data that has been analyzed. The reference manager application is the second tool to set up. Applications that can be used include Publish or Perish, as shown in Figure 2.



Figures1VosViewer

Figures2PublishOnPerish

RESULTS

a. Publication Development

From 2013 to 2023, Figure 1 shows the development of international publications on the topic self-efficacy in teaching statistics, with the largest increase occurring in 2021 with 36 publications. This shows that research self-efficacy in teaching statistics still attracts many researchers today.

Figures3: Development of Google Scholar Article Data Source Publication

b. Core Journal self-efficacy in teaching statistics

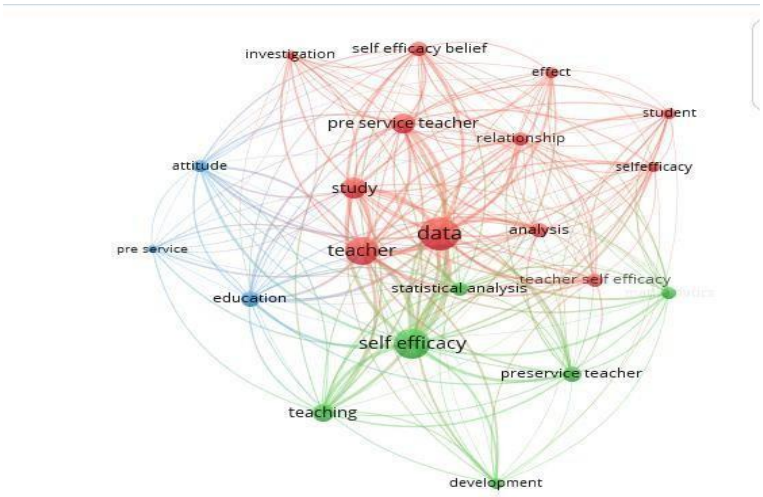
Result From Search Conducted in 2013–2023 on Google Scholar, 200 publication found in words teaching statistics self efficacy, self efficacy to teach statistics and preservice secondary mathematics teachers. Of these, 52 articles were published inTaylor & FrancisJournal, and 44 in ERIC. Table 2 follows several other journals that publish research with the theme self-efficacy in teaching statistics

No	Publishers	Number of articles	No	Publishers	Number of articles
1	academia. edu	3	24	iopscience.iop.org	1
2	ajol. info	1	25	jl4d. net	1
3	avesis.gazi.edu.tr	2	26	journals.humankinetics.com	1
4	borneojournal.um.edu.my	1	27	journals.sagepub.com	10
5	cambridge.org	2	28	JSTOR	1
6	ceeol.com	2	29	learntechlib.org	2
7	cimt.org.uk	1	30	meridian.allenpress.com	1
8	clitejournals. com	2	31	mojes.um.edu.my	1
9	curriculumstudies.org	1	32	muse. jhu. edu	1
10	dergipark.org.tr	9	33	ojs.fkip.ummetro.ac.id	1
11	dialnet.unirioja.es	1	34	psycnet.apa.org	3

12	econtent.hogrefe.com	1	35	repository.futminna.edu.ng	1
13	educational technology journal	1	36	researchgate. net	3
14	ejmste.com	7	37	scholarworks.utrgv.edu	1
15	Elsevier	5	38	search.ebscohost.com	1
16	emerald.com	2	39	search.informit.org	3
17	eprints.umpo.ac.id	1	40	search.proquest.com	1
18	ERIC	44	41	Springer	17
19	iejee.com	1	42	stemeducationjournal. springeropen	1
20	ijcses.org	1	43	Taylor & Francis	52
21	ijea.org	1	44	tused.org	1
22	ijese.com	1	45	Wiley Online Libraries	5
23	ingentaconnect.com	1			

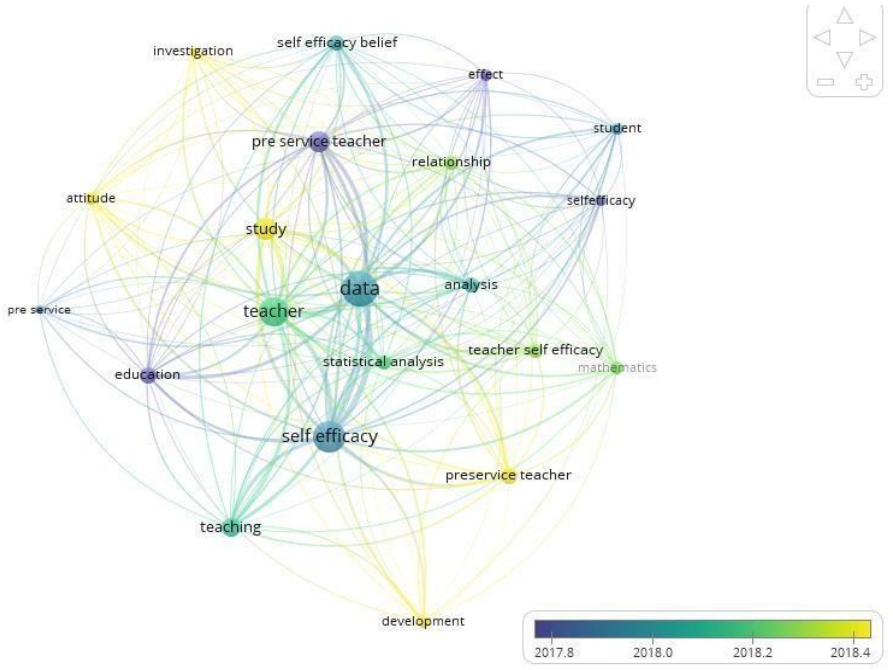
c. Map of Publication Development Based on Keywords

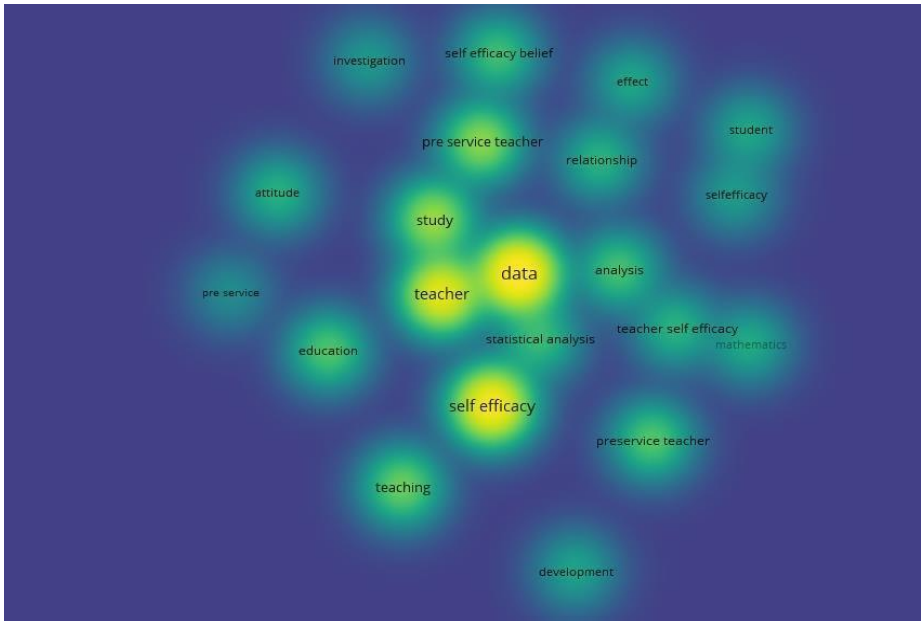
Map development the Scopus self-efficacy in teaching statistics topic area for 2016–2020 is formed into 3 clusters based on keywords (co-words), as shown in Figure 2. Cluster 1red, consists of topic analysis, data, effect, investigation, pre service teacher, relationship, self efficacy belief, student. Cluster 2 consists of the topics of development, mathematics, statistical analysis, teaching. Cluster 3 consists of the topic attitude, education.



d. **Co-Word map density visualization**

Items in the cluster density view are marked the same as visible items. Item dots have a color that depends on the density of the item at that time, and it is possible to identify that the color of the dots is assigned based on how the item relates to other items. Co-word densitymaps help you get an overview of the general structure of a bibliometric map by showing which items are considered important for analysis(Muñoz-Leiva et al., 2012). Based on the research results, the most frequently used keywords in publications that show the development of co- word research on self-efficacy in teaching statistics as shown by the density map which is the result of an analysis carried out on all articles related to self-efficacy in teaching statistics from 2013 to 2023. Based on the density map, more yellow color is a larger color with a larger circle diameter, and denser keywords indicate that this color appears more often. Also, the color appears less frequently when mixed against a green background.





DISCUSSION

Based on the results above, it is clear that VOSviewer can be used as a mapping tool for bibliometric data analysis. In this study, the data used to analyze VOSviewer is research on digital learning media, taken from the Google Scholar database. Between 2013 and 2023, the total number of teaching statistics on self efficacy, self efficacy to teach statistics and preservice secondary mathematics teachers received and related to the theme is 200 publications. During this period, the number of these themes changed slightly, but in 2021, the number of publications began to increase rapidly. Map of the development of research on self-efficacy in teaching statistics. Cluster 1 contains 12 topics, cluster 2 contains 6 topics, cluster 3 contains 3 topics.

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