Research Trend of Vigotsky Theory in Children's Education From 2013 to 2023:
A Bibliometric Review and Analysis

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Abstract

This article was written to analyze the research trend of Vigotsky theory in Children's Education from 2013 to 2023. The method used is bibliometric analysis, assisted by the VOSviewer application. The object of study is the title and abstract of 29 scientific articles from international journals indexed by journal from 200 documents in the last ten years. The data was obtained using the keywords "Creative imagination, vygotsky, creative thinking, and critical thinking. " The results show the network, overlay, and density between parts. The visualization results show: The creative imagination contained in Vygotsky's theory is developed through creative thinking abilities and critical thinking abilities in children's learning processes. Therefore, based on the results of this bibliometric analysis, it provides an overview and opportunities for carrying out future research.

Keywords: Bibliometrics, Creative Imagination, Children Education, Creative Thinking, Critical Thinking

Introduction

Student development in elementary schools in all subjects focuses on thinking skills. All students at all educational levels possess the ability to think. The stimulus from the environment given to students will differentiate their ability to think (Kidd, F, 1983). Creative thinking and critical thinking are thinking skills that are often studied and developed to optimize thinking abilities. One example of children having good cognitive intelligence is their ability to think.

Imagination is a natural talent possessed by every human being, including elementary school children (Niland, 2023). The initial source of thinking skills and ideas begins with the formation of questions. This seemingly simple question from an elementary school student is a problem that requires an answer or solution. Each child with different thinking and cognitive abilities will produce a variety of different answers when faced with a problem. Every child has the same right to express opinions, because of their different creative potential.

Literature Review

Creativity is one of the competencies that students must have in the 21st century learning process. Research on creativity in the world of education continues to develop in various, more detailed aspects. Creative thinking and creative activities are different things, even though they originate from the same initial potential, namely imagination. History finds Vygotsky as an educational figure who was also a psychologist who created many theories about the learning process, development and creativity.

Imagination and creativity go hand in hand to produce an idea. Imagination without creativity will not produce a work (Lubis, 2022). Creativity without the encouragement of imagination will produce ordinary works without high levels of creativity and differentiation. Elementary school age children have great potential for exploring their imagination (Fazli et al., 2019). Awareness of the importance of understanding thinking will provide greater space for the growth of children's imaginative potential. The doctrinal style is not recommended for the development of children's imagination. There needs to be freedom to foster imagination so that more diverse ideas emerge (Díaz-lefebvre, 2006; Fleming, 2015; Supriatna, 2019). Soaring beyond the mere urge to control one's existing inner and outer world, individuals high in openness or intelligence can go further by developing their own creative ideas into something tangible, whether it be a work of art or a scientific discovery. This is the cause of the relationship between openness and creativity (Oleynick et al., 2014; Thrash et al., 2010).

Method

The complete data used for this work is based on data collection in publications published and indexed by Google Scholar indexed scientific journals. Google Scholar was chosen for this work because it is open source. Publish or perish, a reference management application, is used to obtain research data for the next stage. Publish or Perish software is usually used by researchers to conduct literature reviews on selected topics, while detailed information for software installation, step-by-step steps to obtain data, and library data in Google Scholar have been explained (Effendi et al., 2021).

Research is carried out through the following mechanisms:
  (i) The process of collecting publication data with the help of publish or perish software,
  (ii) Stage of processing article bibliometric data obtained using Microsoft Excel software,
  (iii)Mapping analysis of bibliometric data in elementary school mathematics teacher professional development program publications using the VOSviewer application, and
  (iv)Analysis of computational mapping results.

The article data available on Publish or Perish are publications filtered using the keywords "Professional Development", "Mathematics Learning", and "Elementary Teachers" based on "Journal" as the publication title. The papers used were selected only in the last decades between 2013 to 2023. Papers that have been selected and meet the criteria for this work of analysis are then exported into two file types: research information system (.ris) and comma separated value format (* .csv). The VOSviewer tool can also be used to provide visualization and depict bibliometric map usage trends. Article data imported from the database is then mapped automatically. VOSviewer is used to create variations of results as mapping publications, namely network visualization, density visualization, and network-related overlay visualization (co-citation) between available items.

Results and Discussion

Publication Data Search Results

Based on an article search via Publish or Perish software from the Google Scholar database, 29 works met the criteria and were then collected for research. These papers were obtained in the form of article metadata stating the author's name, article title, year of publication, journal name, publishing institution, number of citations, links, and URL. Table 1 shows some samples of published articles used for this bibliometric study. The samples taken were the 29 best articles with more than 60 citations available in Table 1.

Table 1. Use of Table Captions

No	Writer	Title	Year	Quote
1	E Bodrova , C Germeroth, DJ Leong	Play and self-regulation: lessons from Vygotsky.	2013	405
2	E Bodrova , DJ Leong	Vygotskian and Post-Vygotskian Views on Children's Play.	2015	348
3	S Edwards	Digital play in the early years: A contextual response to the problem of integrating technologies and play-based pedagogies in the early childhood curriculum	2013	244
4	P Hakkarainen, M Bredikyte, K Jakkula, ...	Adult play guidance and children's play development in a narrative play-world	2013	225
5	AS Kier, JS McMullen	Entrepreneurial imaginativeness in new venture ideation	2018	190
6	C Walia	A dynamic definition of creativity	2019	189
7	S Mihardi , MB Harahap , RA Sani	The effect of project based learning model with kwl worksheet on student creative thinking process in physics problems	2013	174
8	N Leggett	Early childhood creativity: Challenging educators in their role to intentionally develop creative thinking in children	2017	173

9	S Marginson , TKA Dang	Vygotsky's sociocultural theory in the context of globalization	2017	173
10	C Kiewra, E Veselack	Playing with Nature: Supporting Preschoolers' Creativity in Natural Outdoor Classrooms.	2016	164
11	J Marsh, L Plowman, D Yamada-Rice, ...	Play and creativity in young children's use of apps	2018	158
12	S Ahmad, AH Ch, A Batool, K Sittar , M Malik	Play and Cognitive Development: Formal Operational Perspective of Piaget's Theory.	2016	154
13	S Broström	A dynamic learning concept in early years' education: A possible way to prevent schoolification	2017	141
14	S Astutik , BK Prahani	The Practicality and Effectiveness of Collaborative Creativity Learning (CCL) Model by Using PhET Simulation to Increase Students' Scientific Creativity.	2018	134
15	S Edwards	Play-based learning and intentional teaching: Forever different?	2017	122
16	F González Rey	The topic of subjectivity in psychology: Contradictions, paths and new alternatives	2017	114
17	S Edwards, A Cutter-Mackenzie	Pedagogical play types: What do they suggest for learning about sustainability in early childhood education?	2013	106
18	L Widiawati , S Joyoatmojo , S Sudiyanto	Higher order thinking skills as effect of problem based learning in the 21st century learning	2018	104
19	F Gonzalez Rey	Advancing the topics of social reality, culture, and subjectivity from a cultural–historical standpoint: Moments, paths, and contradictions.	2016	98
20	MT Bowers, BC Green, F Hemme, ...	Assessing the relationship between youth sport participation settings and creativity in adulthood	2014	86
21	M Hofman	What is an education for sustainable development supposed to achieve—A question of what, how and why	2015	85
22	JR Yarbrough	Adapting Adult Learning Theory to Support Innovative, Advanced, Online Learning--WVMD Model.	2018	82
23	S Sanders	Critical and creative thinkers in mathematics classrooms	2016	81
24	C Nilson, CM Fetherston, A McMurray, ...	Creative arts: An essential element in the teacher's toolkit when developing critical thinking in children	2013	80
25	S Robson	The Analyzing Children's Creative Thinking framework: development of an observation led approach to identifying and analyzing young children's creative thinking	2014	76
26	A Stetsenko, PCG Ho	The serious joy and the joyful work of play: Children become agentive actors in co-authoring themselves and their world through play	2015	76
28	E Yayuk , AR As'ari	Primary School Students' Creative Thinking Skills in Mathematics Problem Solving.	2020	74
29	NM Siew, CL Chong, BN Lee	Fostering fifth graders' scientific creativity through problem-based learning	2015	70
30	H.G. Conklin	Toward more joyful learning: integrating play into frameworks of middle grades teaching	2014	68

Development of Vygotsky's Theory Research in Elementary School Education

Table 2 describes the development of research in professional development programs in mathematics learning at the elementary level published between 2013 and 2022 on the Google Scholar indexed journal platform. From the data displayed in Table 2, the number of research on mathematics learning professional development programs at the elementary level during this period was 1038 but due to limitations in software results, only 996 data were filtered.

Table 2. Development of Vygotsky's Theory Research in Elementary School Education

Year study	Amount citation
2016	818
2017	1166
2018	1108
2019	224
2020	447
2021	301
2022	107
2023	24
total citations	4195
average citations	524.38

The highest number of citations in this research field was in 2017 with 1166 citations, followed by 1108 in 2018. This data shows a fluctuating trend from 2017 to 2018 before dramatically decreasing with only hundreds of citations in each of the following four years and most recently 24 citation in 2023.

The line graph in Figure 1 clearly depicts the trend.
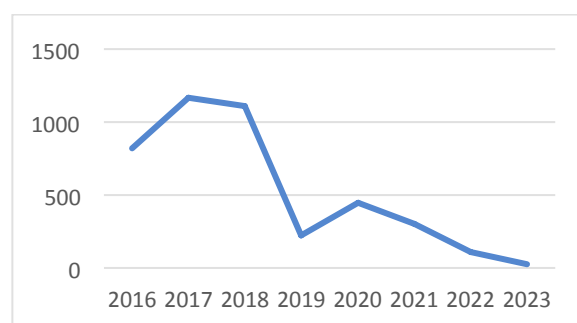
Figure 1. Line chart of the development of research on Vygotsky's theory in elementary school education in the last 10 years

Computational mapping methods were carried out on the data of all articles. VOSviewer is used for computational mapping. Computational mapping showed 69 items found. All items found are related to development of professional development research in mathematics learning at elementary school level in data mapping divided into 7 clusters;
  (i) Cluster 1 has 1 or 2 items such as Creative art, Time, Children's Imagination, image, path, personality trait, emotion, perception, form, process, effect, context.

(ii) Cluster 2 consists of 10 items such as : lesson, imaginary situation, creative, Vygotskys , goal, new idea, line, new idea, imaginative thinking, design thinking.

(iii)Class 3 has 8 items which include school, instruction , zone, creativity, hand, product, students imaginative play, perspective.

(iv)Class 4 includes 11 items, namely imaginary situation, science, impact, Vygotsky's theory, society, cognitive, effectiveness, thinking skills, curiosity, Lev Vygotsky, critical thinking skills.

(v) Cluster 5 contains 9 items such as reality, basis, component, creative activity, thought, preschool child, preescholl children, human imagination, relations.

(vi)Cluster 6 has 6 items, namely outcome, review, cognitive development, Piaget, complexity, creative thinking skills.

(vii)Cluster 7 has 13 items, among others way, creation, aspect, order, opportunity, critical, thinker, article, knowledge, part, paper, something, mathematics.

The relationship between one word and another is shown in each cluster. The diameter of the circle for each term depends on the frequency of appearance of that term (Nandiyanto et al., 2021). The size of the label circle shows a positive correlation with the appearance of the term in the title and abstract (Nandiyanto & Al Husaeni, 2021) which means that the more often the term appears, the larger the size of the label (Al Husaeni & Nandiyanto, 2022). The mapping visualization described in this research consists of 3 parts, namely network visualization (see Figure 2), overlay visualization (see Figure 3), and density visualization (see Figure 4) (Hamidah et al., 2020).

Figure 2 is a network visualization that breaks down the relationships between each term. The relationship of terms to each other is described through an interconnected network. Figure 2 illustrates 7 clusters that are often researched and related to research topics in Vygotsky's theory about children's education and creativity . Figure 3 provides an overview of overlay visualization in professional development program research. Overlay visualization is considered a visualization of the novelty of research on related terms (Hamidah et al., 2020).
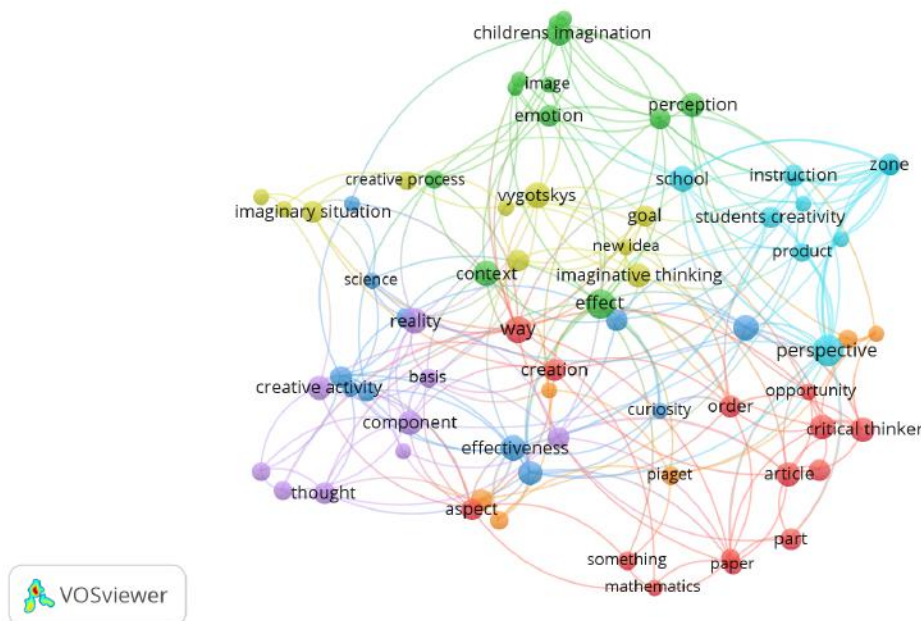
Figure 2. Visualization of Vygotsky's Theory Research Network in Elementary School Children's Education in the Last 10 Years
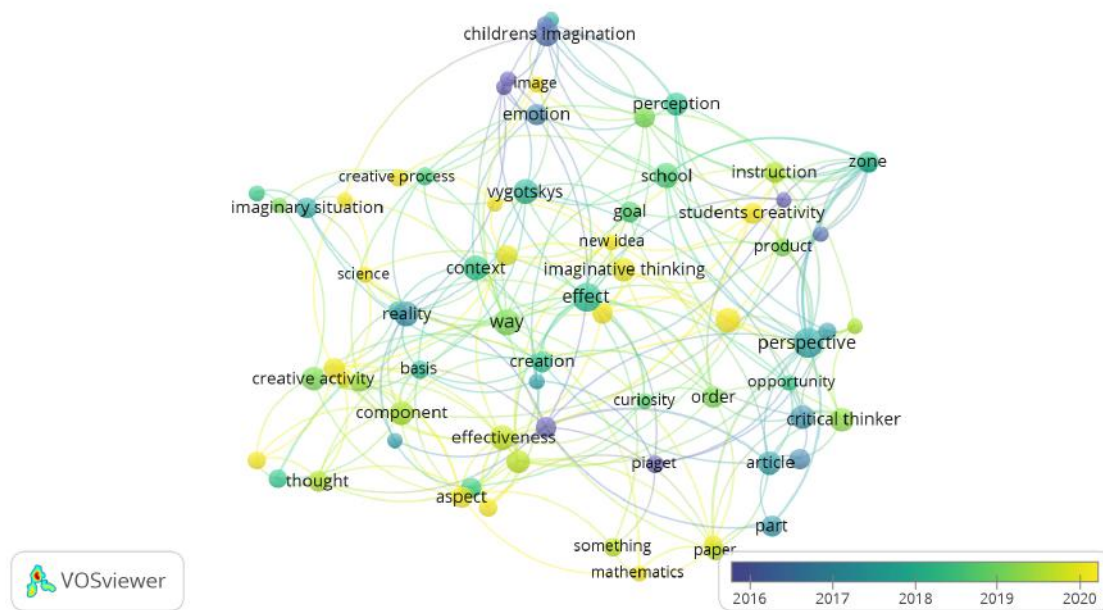
Figure 3. Overlay visualization of Vygotsky's theoretical research on children's education in the last 10 years
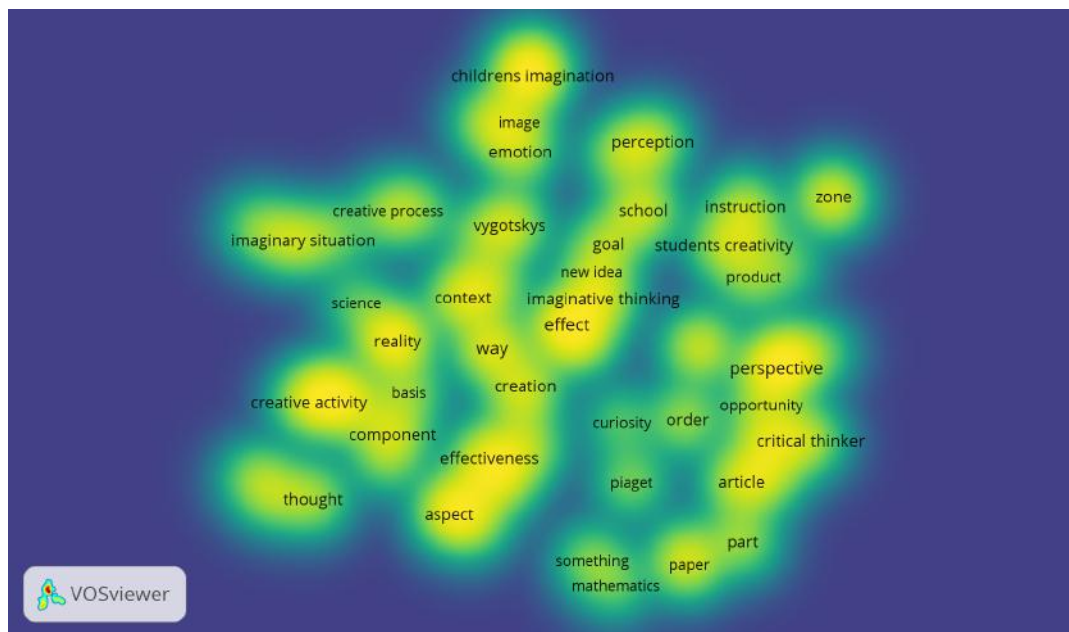
Figure 4. Research Visualization Density of Vygotsky's Theory Research on Children's Education in the Last 10 Years

Figure 4 visualizes density, meaning that the brighter the yellow color and the larger the diameter of the term label circle, the more often the term appears (Schrlau et al., 2016). This means a lot of research on related terms has been done. Conversely, the smaller the number of studies related to the term, the less visible the yellow color is.

Conclusion

This research aims to carry out computational mapping analysis on bibliometric data from scientific works. The publication topic chosen in this research is research trends in Vygotsky's

theory in elementary education . The articles used as sources were obtained from the Google Scholar database using Publish or Perish software. The library data used in this research includes titles and abstracts. 996 relevant articles were found for a decade, from 2013 to 2023. The research results show that Vygotsky's theory on children's education has experienced a decreasing trend in the last five years, after experiencing fluctuations in research from the beginning of the period until 2018. The research results of this study show that there are opportunities for research Using Vygotasky's theory in children's education can be used as an open basis for further in-depth study.

Author Contributions

Mia Zultrianti Sari carried out the mapping and analyzed the contents following directions from Nana Supriatna. Disman as supervisor and assessor provides input and re-examines the results of the analysis that has been carried out. There was a process of guidance and joint discussion and finally all authors agreed on the final version.

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