RESEARCH TRENDS ON CHARACTER EDUCATION AND INTERACTIVE LEARNING MULTIMEDIA IN ELEMENTARY SCHOOL: A BIBLIOMETRIC ANALYSIS

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Abstract

Using VOSviewer software, this study aims to determine research trends by conducting bibliometric analysis mapping of articles obtained from Google Scholar on the topic of character education and interactive learning multimedia in elementary schools. The keywords "character education," "interactive learning multimedia," and "elementary school" were used to gather article data using the Publish or Perish manager tool. There were 992 articles from 2012 to 2022 in the results. Multimedia interactive learning and network visualization education are not closely related. The most researched topic is interactive multimedia learning with learning motivation. In the meantime, it is difficult to understand how interactive multimedia, elementary school, and character education are related to network visualization. These findings suggest that there is still a dearth of studies on the relationship between multimedia interactive learning and character education in primary schools. This finding indicates that there is a great chance to undertake this research in the future, which will lead to innovative findings.

Keywords: Interactive Learning Multimedia; Character Education; Elementary School; Bibliometric; VOSviewer.

Abstrak

Dengan menggunakan perangkat lunak VOSviewer, penelitian ini bertujuan untuk mengetahui tren penelitian dengan melakukan pemetaan analisis bibliometrik terhadap artikel-artikel yang diperoleh dari Google Scholar dengan topik pendidikan karakter dan multimedia pembelajaran interaktif di sekolah dasar. Kata kunci "pendidikan karakter ", "multimedia pembelajaran interaktif", dan "sekolah dasar" digunakan untuk mengumpulkan data artikel dengan menggunakan alat bantu Publish or Perish. Hasilnya, terdapat 992 artikel dari tahun 2012 hingga 2022. Visualisasi jaringan terhadap topik Multimedia pembelajaran interaktif dan pendidikan tidak terkait erat. Topik yang paling banyak diteliti adalah pembelajaran multimedia interaktif dengan motivasi belajar. Sementara itu, sulit untuk dipahami visualisasi jaringannya tentang multimedia interaktif, sekolah dasar, dan pendidikan karakter. Temuan ini menunjukkan bahwa masih ada kelangkaan studi tentang hubungan antara multimedia pembelajaran interaktif dengan pendidikan karakter di sekolah dasar. Temuan ini menunjukkan bahwa terdapat peluang besar untuk melakukan penelitian ini di masa depan, yang akan menghasilkan temuan yang inovatif.

Kata Kunci: Multimedia Pembelajaran Interaktif; Pendidikan Karakter; Sekolah Dasar; Bibliometrik; VOSviewer.

Introduction

Research phenomena and advancements in a variety of research domains may now be effectively studied using bibliometric analysis, which also helps to provide an updated perspective on research boundaries and trends (Aria & Cuccurullo, 2017; Donthu et al., 2021; Sinha, 2012; Wang et al., 2021; Zupic & Čater, 2015). Over the past few years, it has been

demonstrated that this approach has increased the number of publications and offers significant benefits for automated data processing (Ellegaard & Wallin, 2015). Various studies have been carried out on the subject of education (Al Husaeni et al., 2023), one of which is research in the field of character education. An education including character education is crucial and the primary factor in the development of human resources. High-quality human resources are required to realize a just and prosperous Indonesia. A country can choose its future course through education when it comes to overcoming obstacles and adapting to changing times. It means that the country's destiny will be determined by its educational attainment; it will either grow to be sizable, educated, civilized, and ready to adapt to new circumstances, or it will deteriorate and become mired in its own issues (Amri et al., 2020; Funa & Prudente, 2021).

Previous research using bibliometric analysis has been conducted especially about character education, such as research about bibliometric analysis on character education in physical education learning model (Muhtar et al., 2021), bibliometric analysis about values education (Gulum, 2023; Sökmen & Nalçacı, 2017; Sönmez & Bozdoğan, 2020), bibliometric analysis on moral education (Julia et al., 2020), and bibliometric analysis of character education management in the school environment (Mayasari et al., 2023). However, bibliometric analysis research on interactive learning multimedia and character education in elementary schools has not been widely conducted, especially to analyze and to describe the development of such research using the VOSviewer application. Thus, the purpose of this study was to use VOSviewer software to perform bibliometric analysis mapping of publications on interactive learning multimedia and character education in elementary schools that were sourced from Google Scholar. The novelties of this study are (i) the investigation of the relationship between interactive learning multimedia and character education, (ii) the analysis of the research trend on interactive learning multimedia and character education in elementary schools, and (iii) the identification of the next area of future research. Thus, this study can serve as a guide for conducting and selecting research topics for future studies, particularly those pertaining to multimedia-based interactive learning innovations in primary school.

Research Methods

This study applied bibliometric analysis of research trends using Publish or Perish and Vosviewer software to examine interactive learning multimedia and character education in primary schools. The keywords "character education," "interactive learning multimedia," and "elementary school" were used to gather article data using the Publish or Perish manager tool in December 2023. The article gained from google scholar database sources. There were 992 articles from 2012 to 2022 in the results. The gathered articles are then exported into two different document formats: research statistics system (.ris) and comma-separated values format (*.csv), in accordance with the analytical criteria of this study. Additionally, trends were visualized and assessed using bibliometric maps and VOSviewer. The article data was first mapped using three different mapping variations: network, overlay, and density visualization. Then, the results of the data visualization were analyzed.

Result and Discussion

With the use of the publish or perish application, the article search produced results for 992 published publications in the Google Scholar database, totaling 33,540 citations across all articles. There are 2795.00 citations from the article per year. In the meantime, there are 33.81 citations per publication and 2,64 authors on average among the articles that are used. Then, the h-index of all articles is 87 and g-index of all articles is 148. The following are the 10 best

articles relevant to the topic of interactive learning multimedia and character education in elementary schools, based on the highest number of citations shown in Table 1.

Table 1. Publication of interactive learning multimedia and character education in elementary school

No	Authors	Title	Year	Cites
1	Kebritchi, M., et al.	Issues and challenges for teaching successful online courses in higher education: A literature review	2017	1352
2	Puspitarini, Y. D., & Hanif, M.	Using Learning Media to Increase Learning Motivation in Elementary School.	2019	848
3	Chiang, T. H., Yang, S. J., & Hwang, G. J.	An augmented reality-based mobile learning system to improve students' learning achievements and motivations in natural science inquiry activities	2014	809
4	Parong, J., & Mayer, R. E.	Learning science in immersive virtual reality.	2018	791
5	Ciampa, K.	Learning in a mobile age: an investigation of student motivation	2014	659
6	Kukulska-Hulme, A., & Viberg, O.	Mobile collaborative language learning: State of the art	2018	415
7	Leow, F. T., & Neo, M.	Interactive multimedia learning: Innovating classroom education in a Malaysian university.	2014	386
8	Chu, H. C.	Potential negative effects of mobile learning on students' learning achievement and cognitive load—A format assessment perspective	2014	367
9	Yulia, H.	Online learning to prevent the spread of pandemic corona virus in Indonesia	2020	352
10	Elbes, E. K., & Oktaviani, L.	Character Building In English For Daily Conversation Class Materials For English Education Freshmen Students	2022	334

Research trends on interactive learning multimedia and character education are obtained by classifying data sourced from Google Scholar based on the year of publication. The research pattern is shown in Figure 1. There were 24 journal articles published in 2012 that were indexed by Google Scholar. There was an increase in the number of publications in 2013, with as many as 48 articles. The number of article publications in 2014 was 43 articles; in 2015, there were as many as 41 articles; and in 2016, there were as many as 40 articles. Although the decrease in article publication was not statistically significant, it can be inferred that between 2014 and 2016, the quantity of articles published decreased. The research trend continues to increase from 2017 to 2022 (59, 84, 111, 142, 180, and 210 articles respectively). This shows that in the first four years between 2013 and 2016, there was a decrease in research trends related to interactive learning multimedia and character education. However, an increase in research trends on these topics occurred in 2017–2022. The data showed that the research trend on interactive learning multimedia and character education in the last 6 years (2017–2022) has increased.
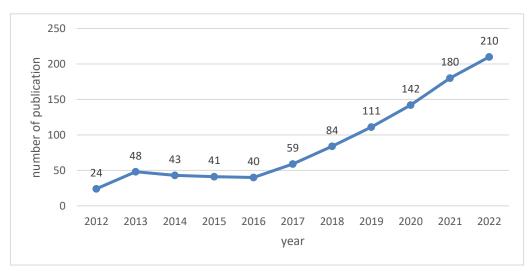
Figure 1. Level of research trends on interactive learning multimedia and character education in elementary school

Based on the findings, computational mapping was used to find 70 items, which were then grouped into 5 clusters depicted in Figure 2. Each item is related based on the categorized cluster. Three schemes—network visualization, overlay visualization, and density visualization—were used to analyze the mapping visualization in this study. A network or line that represents the relationship between terms is one term to another (Nandiyanto et al., 2021). As seen in Fig. 3, some circles have labels connected by a line, varying in color and size. The term's occurrence in the title and abstract is positively correlated with the size of the labeled circle. On the other hand, the density visualization displayed in Fig. 5 indicates that a greater application of the yellow color indicates a greater amount of research on this issue; on the other hand, a darker yellow color or one that fades and mixes with the background indicates a lesser amount of research (Al Husaeni et al., 2023; Fitria et al., 2022; Nandiyanto et al., 2021).

In Figures 3 and 4, the network visualization is shown. The rise in research trends over the previous six years is a significant phenomenon that has to be investigated collectively. It thus provides a fantastic chance for scholars to carry out research. In 2022, there were 210 articles published, which is a fairly high quantity.

Character education, effects, and online learning make up the three categories into which research on interactive learning multimedia and character education in primary schools is divided, as shown in Figure 3. Character education is a phrase that has 136 occurrences, 60 linkages, and 222 link strengths in cluster 1. With 94 occurrences, 162 total link strengths, and 53 total links, the term "effect" is grouped in cluster 2. With 103 total link strengths, 56 occurrences, and 49 total links, the phrase "online learning" is placed in Cluster 4. Nevertheless, the phrase interactive learning multimedia does not appear in the list of terms that have been used most frequently in publications during the past ten years.
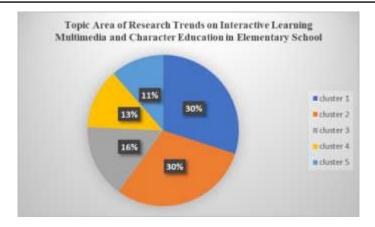
Figure 2. Topic Area of Research Trends on Interactive Learning Multimedia, Character Education, and Elementary School Keywords
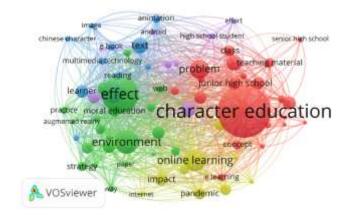

Figure 3. Network visualization of Interactive Learning Multimedia, Character Education, and Elementary School Keywords

Figure 4 shows that character education is related to other terms. However, there is no clear relationship between the terms "interactive learning multimedia" and "character education", so the relationship between character education and interactive learning multimedia cannot be clearly seen. This indicates that there is limited published research on the relationship between character education and interactive learning multimedia.
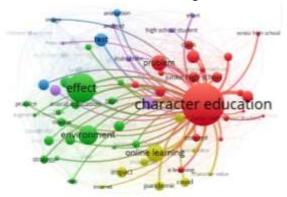

Figure 4. Network visualization of the relation between Interactive Learning Multimedia and Character Education

The majority of the top 10 papers, as determined by the number of citations, address interactive learning multimedia for academic achievement and student learning motivation. These results suggest that the research trend from 2012 to 2022 places the main focus of research on interactive learning multimedia for academic achievement and student learning motivation. This finding is reinforced by previous research, which shows that using interactive multimedia in the learning activities can help elementary school students grasp civic topics and be more motivated to learn (Sartono et al., 2022) and using instructional message-based multimedia provides better learning outcomes (Lauc et al., 2020). Since multimedia is visually appealing and includes animation and video elements, it makes students feel satisfied and motivated to learn (Suri & Rachmadtullah, 2021).

The term character education is visible in the ten articles with the highest number of citations and network visualization. This makes it possible to analyze the relationship between interactive learning multimedia and character education. Interactive multimedia educational resources can be used to enhance students' character development and are practical for use in the classroom (Septiani et al., 2020) and students will be more interested in participating in learning with technological innovations (Huda et al., 2025). Therefore, the result of the study can be concluded that the study on the relationship character education and interactive learning multimedia is still limited.
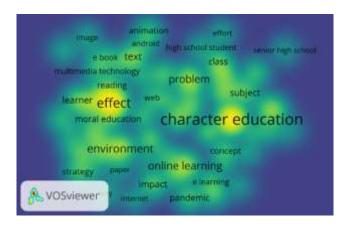

Figure 5. Density visualization of character education and interactive learning multimedia

Conclusion

Research trends on the topic of character education and interactive learning multimedia increased from 2017 to 2022. Nonetheless, based on the network visualization, the term interactive learning multimedia is not directly related to the term character education, so the relationship between interactive learning multimedia and character education in elementary schools cannot be seen clearly. It can be concluded that research on the relationship between interactive learning multimedia and character education in elementary schools is still limited. Research on this topic has a great opportunity to be conducted in the future to provide research novelty.

References

Al Husaeni, D. F., Nandiyanto, A. B. D., & Maryanti, R. (2023). Bibliometric analysis of educational research in 2017 to 2021 using VOSviewer: Google scholar indexed research. *Indonesian Journal of Teaching in Science*, *3*(1), 1–8.

Amri, F., Djatmika, E. T., Wahyono, H., & Widjaja, S. U. M. (2020). The effect of using

simulation on developing students' character education in learning economics. *International Journal of Instruction*, *13*(4), 375–392. https://doi.org/10.29333/iji.2020.13424a

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

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

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics*, *105*(3), 1809–1831. https://doi.org/10.1007/s11192-015-1645-z

Fitria, D., Husaeni, A., Bayu, A., Nandiyanto, D., & Maryanti, R. (2022). *Bibliometric Analysis of Educational Research in 2017 to 2021 using VOSviewer: Google Scholar indexed Research*. https://doi.org/10.17509/xxxx.xxxx

Funa, A. A., & Prudente, M. S. (2021). Effectiveness of problem-based learning on secondary students' achievement in science: A meta-analysis. *International Journal of Instruction*, *14*(4), 69–84. https://doi.org/10.29333/iji.2021.1445a

Gulum, B. (2023). Görsel Sanatlar Dersi Ekseninde Değerler Eğitimi ile İlgili Yapılmış Çalışmaların Bibliyometrik Analizi. *E-International Journal of Educational Research*. https://doi.org/10.19160/e-ijer.1231517

Huda, M. M., Sapriya, S., Sopandi, W., Rohartati, S., Mz, A. F. S. A., Kharisma, A. I., Farokhah, L., Nufus, A. B., & Ariffiando, N. F. (2025). Design of Web-Based Media Using Radec for Supporting Sustainability in Elementary School Through Catfish Cultivation. *Journal of Engineering Science and Technology*, *20*(2), 134–141.

Julia, J., Supriatna, E., Isrokatun, I., Aisyah, I., Nuryani, R., & Odebode, A. A. (2020). Moral Education (2010-2019): A Bibliometric Study (Part 1). *Universal Journal of Educational Research*, *8*(6), 2554–2568. https://doi.org/10.13189/ujer.2020.080639

Lauc, T., Jagodić, G. K., & Bistrović, J. (2020). Effects of multimedia instructional message on motivation and academic performance of elementary school students in Croatia. *International Journal of Instruction*, *13*(4), 491–508. https://doi.org/10.29333/iji.2020.13431a

Mayasari, N., Saputra, D. G., Widiatsih, A., & Purnama, Y. (2023). Bibliometric Analysis in the Realm of Character Education Management in the School Environment. *West Science Business and Management*, *1*(04), 213–222. https://doi.org/10.58812/wsbm.v1i04.244

Muhtar, T., Supriyadi, T., Lengkana, A. S., & Cukarso, S. H. I. (2021). Character education in physical education learning model: A bibliometric study on 2011-2020 scopus database. *International Journal of Human Movement and Sports Sciences*, *9*(6), 1189–1203. https://doi.org/10.13189/saj.2021.090613

Nandiyanto, A. B. D., Al Husaeni, D. N., & Al Husaeni, D. F. (2021). A bibliometric analysis of chemical engineering research using vosviewer and its correlation with Covid-19 pandemic condition. *Journal of Engineering Science and Technology*, *16*(6), 4414–4422.

Sartono, E. ., Sekarwangi, T., & Herwin, H. (2022). Interactive multimedia based on cultural diversity to improve the understanding of civic concepts and learning motivation. *World Journal on Educational Technology: Current Issues*, *14*(2), 356–368. https://doi.org/10.18844/wjet.v14i2.6909

Septiani, A. nisa N. I. S., Septiani, I., Rejekiningsih, T., Triyanto, & Rusnaini. (2020). Development of interactive multimedia learning courseware to strengthen students' character. *European Journal of Educational Research*, *9*(3). https://doi.org/10.12973/eu-jer.9.3.1267

Sinha, B. (2012). Global biopesticide research trends: A bibliometric assessment. *Indian Journal of Agricultural Sciences*, *82*(2), 95–101. https://doi.org/10.56093/ijas.v82i2.15251

Sökmen, Y., & Nalçacı, A. (2017). Available online at ijci.wcci-international.org International Journal of Curriculum and Instruction 12(2) A bibliometric analysis of the articles about values education conditions of the Creative Commons Attribution license (CC BY-NC-ND). In *International Journal of Curriculum and Instruction*.

Sönmez, Ö. F., & Bozdoğan, K. (2020). Bibliometric Analysis Of Values Education Researches Based On Web Of Science Database. In *International Journal of Education Technology and Scientific Researches* (Vol. 5, Issue 13).

Suri, D., & Rachmadtullah, R. (2021). The effectiveness of the use of interactive multimedia on the initial mathematics abilities of low grade students in elementary schools. *Journal of Physics: Conference Series*, *1987*(1). https://doi.org/10.1088/1742-6596/1987/1/012030

Wang, S., Mao, J., Tang, J., & Cao, Y. (2021). Content Characteristics of Knowledge Integration in the eHealth Field: An Analysis Based on Citation Contexts. *Journal of Data and Information Science*, *6*(3), 58–74. https://doi.org/10.2478/jdis-2021-0015

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, *18*(3), 429–472. https://doi.org/10.1177/1094428114562629