

Mapping global research on shadow education: Trends and future agenda

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ABSTRACT

This study aimed to analyze bibliographies of journals, authors, and research topics on shadow education using the Scopus database. Bibliometric analysis focuses on the metadata of journals, authors, and topics, visualized, and analyzed to produce a road map, research trends, and future agenda. The data were obtained from 207 articles published on Scopus downloaded on 29/8/2021 by using “shadow education” or “shadow curriculum” keywords. Furthermore, descriptive statistical methods and bibliometric analysis using Biblioshiny, an R-based application that generates bibliometric maps were used. Shadow education research has not been widely developed. Therefore, this bibliographic study may form the basis for future developments. Shadow education is the highest trend, followed by education and policy, high stakes testing, teacher education, curriculum, academic achievement, and private tutoring. This study provides an overview of trends in journals, authors, and research topics related to shadow education. Specifically, it provides relevant information to develop the potential and related themes in the future.

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1. INTRODUCTION

Academic reform and curriculum development are one indication of changes in the education system [1]–[3], especially the new concept of shadow in education and curriculum. The new concept of “shadow education and curriculum” is an interesting aspect that needs to be examined. Shadow education is an additional out-of-school curriculum provided by educational institutions to help students succeed academically. Incorporating this curriculum enhances the existing understanding of student learning and curriculum concepts [4]–[8] and help solve the weaknesses in educational institutions [9], [10]. Studies on shadow education have significantly increased recently and helped increase the understanding of the scale, nature, and implications of the phenomenon [11]–[13]. Shadow education has long been a major phenomenon in East Asian countries such as Japan, Hong Kong, South Korea, and Taiwan. Shadow education has recently grown in popularity in other Asian countries, as well as in Europe and North America. Private supplementary tutoring has traditionally been a neglected topic in research, though there has been much more research in recent years. A growing body of literature focuses on the shadow education system of private supplementary tutoring in academic subjects that occurs outside of the hours of mainstream formal schooling [14]–[18]. Since the focus of education and teaching is an achievement, it can be incorporated into the wider educational culture [19].

Furthermore, this curriculum forms the basis for developing the shadow education theme worldwide [20]–[24]. During the first two decades, there was a significant expansion of research on shadow education, which resulted in a greater understanding and awareness of cultural similarities and differences [25]–[30]. Following the initial mapping and identification of demand-shaping factors, work on eco-systems with deeper sociological and economic analyses, as well as a greater focus on research methods, was undertaken [31]. Students' school careers will benefit from shadow education. Its content and existence are inextricably linked to the organization of transitions both within and between schools. For some societies, researching shadow education will help us better understand how students are assigned to formal schooling and how social advantages are passed down through generations [32]–[36]. The use of shadow education is driven by educational institutional factors such as limited access and low funding levels [37]. Educational research that uses bibliometric methods to see visualizations and see research trends has not been widely studied, especially those that discuss shadow education. Furthermore, this research complements the analysis of the study of shadow education as an interesting theme that must be developed in discussions in the field of education [38]. Throughout the database search, no research that discusses global research on shadow education has been found. In terms of methodology, this research has a novelty that contributes to the study of shadow education. This study aimed to explain the journal, author, and research topics visualized and analyzed using scopus.com data. Studies on shadow education are vital due to the significance of scientific research in generating ideas and novelty to respond to educational problems. The research question discussed in this article include: i) Three-field plot studies; ii) Source impact; iii) Word cloud; iv) Thematic maps; v) Collaboration World Map.

2. RESEARCH METHOD

Since this study excluded human subjects, a review of board approval was not required. The bibliometric analysis was used to find state of the art in shadow education research. This study used publication data related to shadow education from scopus.com, the largest abstract and the largest citation database of peer-reviewed literature, scientific journals, books, and conference proceedings. The data were downloaded on 29/8/2021 using “shadow education” or “shadow curriculum” keywords. The collected data is analyzed using the Biblioshiny application. There were 217 publications, including 156 articles, 3 books, 28 book chapters, 4 conference papers, 5 editorials, 1 erratum, 1 letter, 3 notes and 16 reviews. All the data were filtered by excluding the types of editorial, erratum, letter, and note. The total publications used were 207. The data is further analyzed using the R-based Biblioshiny application [25], which is freely available from <https://bibliometrix.org>.

The bibliometric study is based on a systematic bibliographical analysis of the literature related to the central study theme, following a sequence of steps: i) Define the search criteria and keyword; ii) Selection of Scopus database; iii) Adjustment and refinement of research criteria; iv) Full export of result; v) Analysis using Bibliometrix application; vi) Conclusion and recommendation for future research as presented in Figure 1. Due to the obvious recent rapid increase in scientific production and its collection in bibliographic databases, bibliometric analysis can now be used to measure scientific activity on specific topics. As a result, a bibliometric analysis was performed to examine the evolution of shadow education in scientific publications.

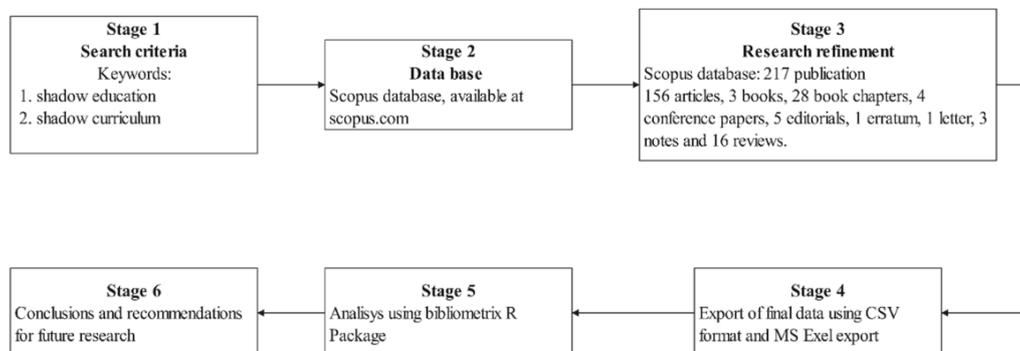


Figure 1. Stages of bibliometric analysis

3. RESULTS AND DISCUSSION

3.1. Three fields plot analysis of shadow education

Three fields plot analysis is important to explain because this analysis is able to display three subject correlations displayed in the visualization. Figure 2 shows the three fields plot, including the source, author, and top topic. These three elements are plotted with a gray color and show the relationship between one field, starting from the reference source, author, and top research keywords/themes. The size of a rectangle in each list shows the number of articles associated with an element. The focus of the three-field plot is in the middle field. AU stands for the author, meaning the focus is on the top author (the main concern), associated with the CR as cited reference, and DE as authors keyword.

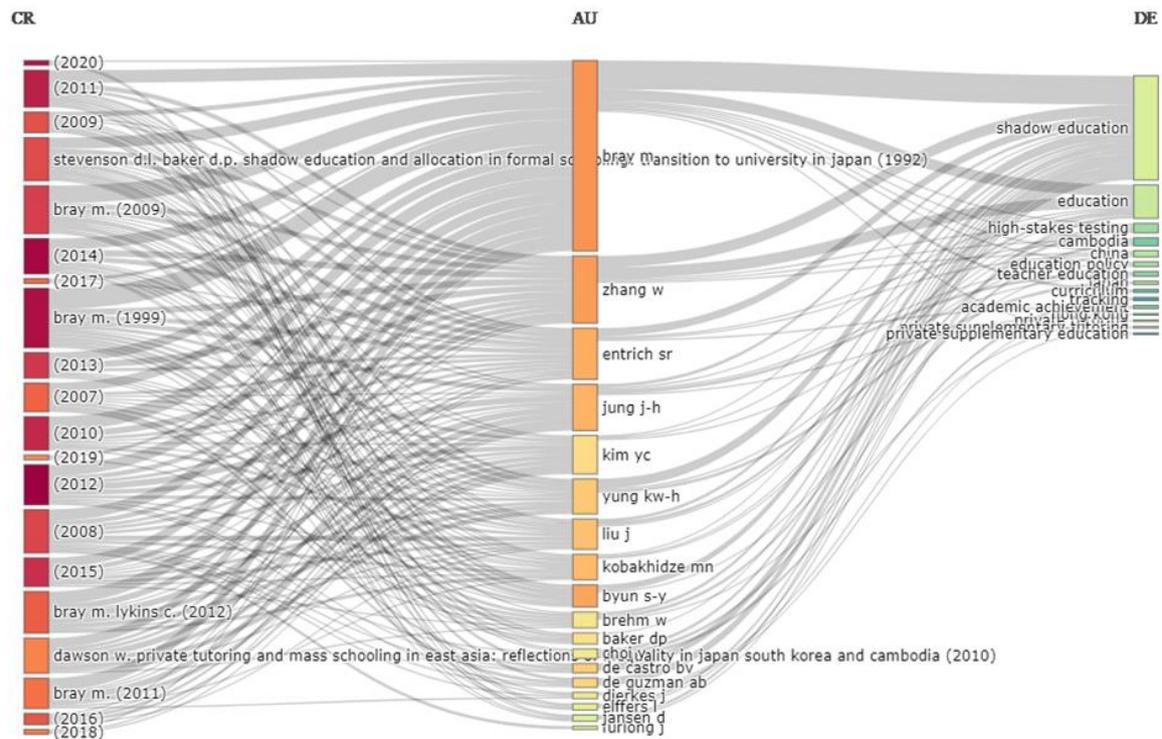


Figure 2. Three fields plot analysis (AU=authors, CR=references, DE=authors keywords)

The key element in Figure 2 is the author, Bray, who has the highest number of publications related to "shadow." He also cites articles published in 2007 and has consistently authored publications on shadow education. In this study, Bray occupies color ranges for various associations. The left field denoted by CR stands for the author's reference article in the middle field (AU), further associated with the study theme (DE). The next author is Zhang, associated with the shorter rectangle than Bray's, which implies that he comes second in the shadow education study. Subsequently, there are Entrich, Jung, Kim, Yung, Liu, Kobakhidze, Byun, Baker, Brehm, Choi, De Castro, De Guzman, Dierkes, Elffers, Jansen, and Furlong, whose scores follow the order of the names. All authors in this study relate to the study theme and reference sources used for the article. According to the right side of the theme, shadow education is the highest trend (light green), followed by education, high stakes testing, education policy, teacher education, curriculum, academic achievement, and private tutoring. The study excluded themes that featured the word 'State.'

This study represents a bibliometric analysis using the Biblioshiny application with a database downloaded from scopus.com. Shadow education has become a very interesting trend for studies, with shadow curriculum, another growing trend, being the derivative of even more interesting research theme variables. Figures 1 to 4 were used, and they confirmed that many shadow education studies are being conducted. A three-plane plot analysis that visualizes the results of three parameters (author, reference, and keywords) was employed, and it shows the correlation of the relationships represented by gray color. The primary focus is on the author and shows that Bray has published the highest number of shadow education themes, and he has also cited several previous works visualized by CR codes. The analysis also shows that shadow education is a theme that involves many authors and citations. These relationships become an

alternative reference for future studies, in which the themes are studied and combined with other themes. This study also emphasizes that the role of government policies in drafting education regulations related to shadow education is very important for the development of shadow education [39]–[42].

3.2. Source impact journal's contribution to the disciplines of shadow education

The source impact study allows a person to view the journal's contribution to the disciplines of science. The source study examines the impact of journals that publish shadow education and curriculum issues by computing journals 'h-index' values. According to Figure 3, the Asia Pacific Education Review had the highest h-index value of 6, using 262 citations. Next on the list are Comparative Education Review, Journal of Curriculum Studies, Oxford Review of Education, and Sociology of Education. The Asia Pacific Journal of Education comes last with an h-index value of 3 and 3 citations. This confirms that the journal has been effective at publishing articles on shadow education. This study displays the top 10 journals based on the h-index values. The results are recommended to be used by authors focusing on shadow education/curriculum. The Source Impact study showed that the Asia Pacific Education Review has the highest h-Index of 6, with 262 citations. This shows that this journal publishes many studies on shadow education and has had a great impact. This information provides a reference for authors and academicians who use the Asia Pacific Education Review as a guide and the place for publications on this education.

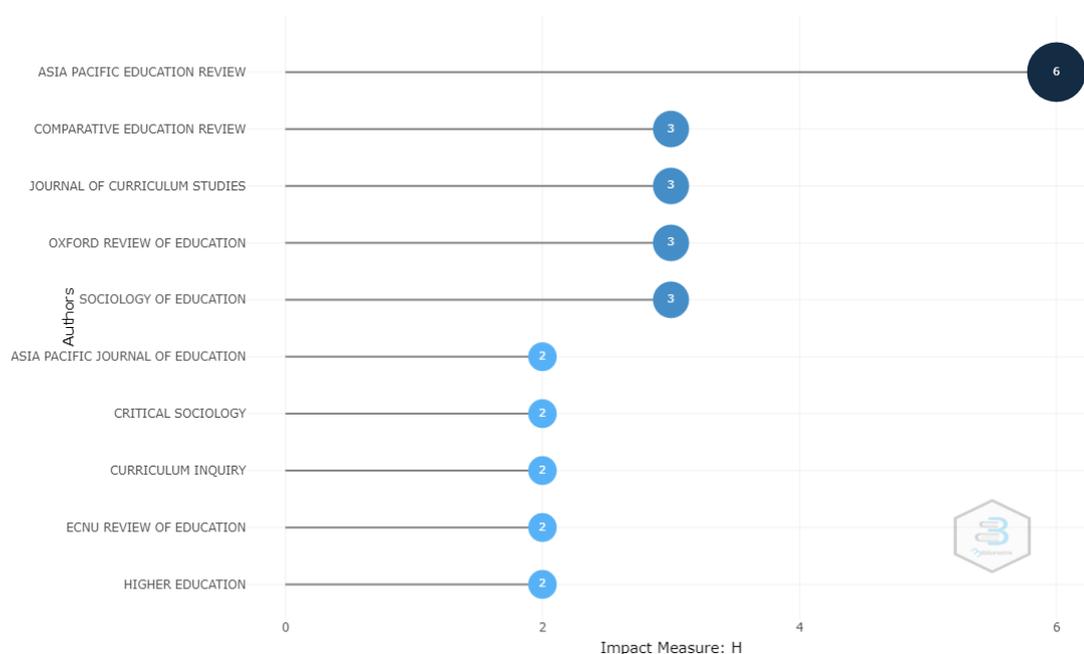


Figure 3. Source impact by journal h-index

3.3. Visualization of keywords based on the number of words used

The word cloud provides a visualization of the most frequently occurring keywords. In Figure 4, the words that appear most often are shadow education, private tutoring, education, and private supplementary tutoring with a frequency of 65, 25, 11, and 8, respectively. Word cloud provides the visual aid depending on the number of times the keywords appear and random word placement. In case a different image is used, keywords with the highest frequency will appear in the middle with relatively larger font sizes. The number of words displayed is 50, and the occurrence determines the frequency. The keywords that appear most often in this study are shadow education, private tutoring education, private supplementary tutoring, education policy, high stake testing, and teacher education with a frequency of 65, 25, 11, 8, 4, 4, and 4, respectively. These keywords are the trending themes in shadow education. When academicians examine the thematic map, they are able to determine prediction and theme development. This analysis provides an alternative overview of collaboration in the field of research on shadow education, given the lack of this study carried out by combining keywords that are most often used by authors. Figure 4 explains that private tutoring is a keyword that is often used in conjunction with shadow education [43]–[47].

The private supplemental tutoring education is suitable for several reasons: i) Private supplemental tutoring exists only because mainstream education exists; ii) As the size and shape of the mainstream system changes, so does the size and form of additional tutoring; iii) In almost all societies more public attention is focused on the mainstream than its shadow; and iv) The features of the shadow system are much more different compared to the mainstream system. Shadow education as an activity intended to help students to improve their school learning in testable subjects [48]–[51].



Figure 4. Visualization of the words that appeared most frequent

3.4. Thematic map analysis and collaboration WorldMap

The thematic map uses 50, 5, 3, and 0.3 words for a min cluster frequency (per thousand docs), the number of labels (per cluster), and label size, respectively. Furthermore, it uses a line of relevance (centrality) and development (density) degrees. According to Figure 5, thematic analysis happens within 4 quadrants, each containing circles with different colors. The right quadrant (motor theme) is spotlighted and represented by a purple circle. It includes the themes of private supplementary tutoring, academic achievement, and the curriculum, which might become a viable basis for study trends in the future. Therefore, the themes in this study accommodate with others to determine future trends. Shadow education, private tutoring, and China are the ideal themes and the core keywords for developing the “shadow” theme. To determine the novelty related to the basic theme raised, the relevance of the research themes needs to be developed. Moreover, education, colonialism, and education reform are potential to be used as variables for this development.

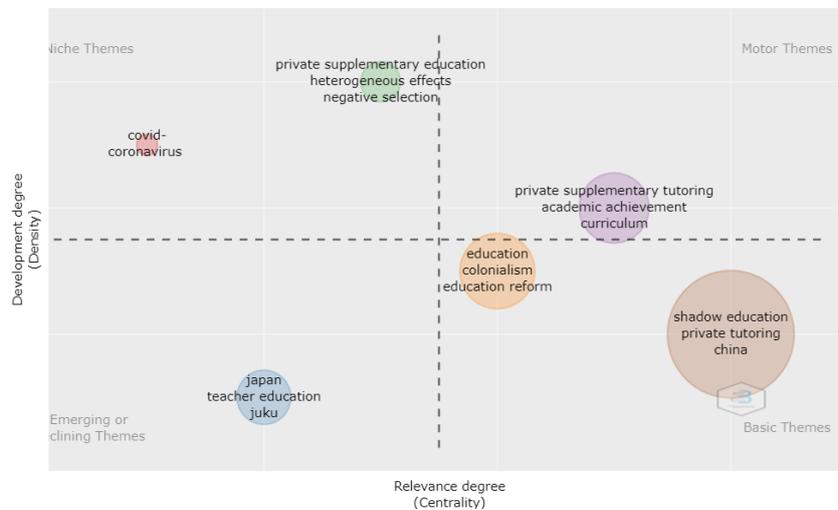


Figure 5. Thematic map analysis

Using the thematic map analysis as shown in Figure 5, six clusters are available. Shadow education (cream), education (orange), private supplementary tutoring (purple), private supplementary education (green), Japan (blue), COVID-19 (pink). State collaboration is an interesting subject that is possible to be examined. It shows a map of study collaboration in shadow education. Figure 6 shows that five countries are working together, including Australia and New Zealand, the USA and Canada, the USA and Korea, Afghanistan and Pakistan, and Australia and Canada with 2, 2, 2, 1, and 1 collaboration(s), respectively. The themes on shadow education can be spread and developed worldwide to promote cooperation between countries. Such steps will impact the field of education, especially through studies and collaboration.

Studies that focus on shadow education, private supplementary tutoring, academic achievement, and curriculum provides a basis for future research trends while incorporating innovations and creations from other academicians. Countries that have collaborations also need to be considered, and new academicians in this field is recommended to use these countries as international collaboration partners on this theme. Private supplementary tutoring, also known as shadow education, has grown in popularity worldwide in recent decades. Such tutoring consumes significant resources and is typically viewed as an investment by participating households that will improve the recipients' academic achievements [52]–[54]. This study supports research on shadow education in Asia and the Pacific: features and implications of private supplementary tutoring, which presents data on the scale and nature of shadow education in Asia and the Pacific, taking into account similarities and differences and including information not only about recipients but also about shadow education providers [55]. There are three types of tutors: entrepreneurs who run various types of tutorial centers, teachers in regular schools who do private tutoring on the side to supplement their incomes, and informal workers such as college students who want to make some extra income.

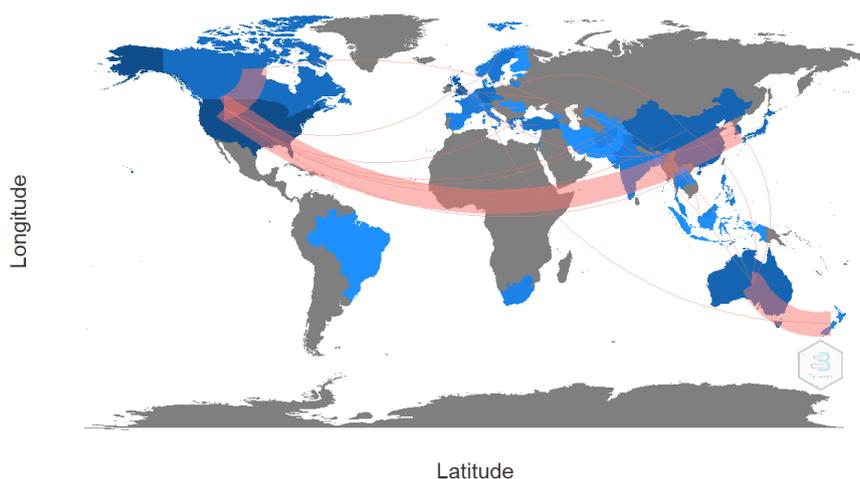


Figure 6. Collaboration WorldMap analysis

4. CONCLUSION

Research on shadow education and curriculum publishing is increasing, which implies a high potential to develop it in the future. Several related topics have been studied, and these provide a basis for development with innovations and creations from other academicians. This is possible by integrating other themes that creates a high novelty. The author who contributed the most to this study and the journal that publishes the highest number of articles on shadow education guides academicians to innovate themes related to shadow education and a journal reference. This study also shows an overview of the trends of journals, authors, and research topics connected to shadow education, laying the ground for academicians to develop the related potential themes in the future. This research is limited in several ways. First, it only focuses on themes in a small scope of curriculum development, which is shadow education, and the analysis used is only limited to a three-field plot study for Source Impact, Word cloud, Thematic Map, and Collaboration WorldMap. Thus, future academicians need to explore other analyses in this application. Second, this study only uses the scopus.com database, therefore future academicians can explore other index metadata sources to ensure the coverage features a broader which can provide comprehensive insight into shadow education. Third, the study uses one application of bibliometric analysis, and for this, future academicians can explore several bibliometric analysis applications to obtain a sharper understanding.

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