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## A BIBLIOMETRIC ANALYSIS OF SELF-EFFICACY IN STUDENT LEARNING ENGAGEMENT FROM 2014 TO 2023

### Abstract

Self-efficacy is recognized as a crucial factor in student learning engagement. In several recent studies on student learning engagement, self-efficacy has shown a positive relationship with it, indicating significant research interest in self-efficacy. Additionally, there has yet to be a bibliometric analysis of self-efficacy and student learning engagement in the past decade. This study aims to conduct a bibliometric analysis and explore the current research landscape on self-efficacy from 2014 to 2023. The research database used for this study is from dimensions.ai. VosViewer is employed for bibliometric analysis and scientific mapping of publications, countries, journals, authors, and terms and keywords. Ninety countries have produced at least five documents each in this research field, with the USA leading in the highest number of publications, followed by China in the second position. Among journals, Nurse Education Today ( $n = 2890$ ) has the highest citation rate, followed by Frontiers in Psychology ( $n = 2512$ ). Key terms in research on self-efficacy and student learning engagement include motivation, engagement, anxiety, academic performance, university student, academic efficacy, burnout, student engagement, life satisfaction, academic procrastination, and teacher support. The literature volume on self-efficacy has experienced growth over the past ten years and is expected to continue to increase. The field of study has also become more refined. This bibliometric analysis provides substantial support for understanding the evolving trends in self-efficacy and student engagement research.

**Keywords:** Bibliometric analysis, VosViewer, Self-efficacy, Student engagement.

### INTRODUCTION

One of the crucial objectives for students at various levels is to achieve high academic performance (Hayat et al., 2020). Among other factors, students' academic achievement is influenced by their self-efficacy (Abdolrezapour et al., 2023). According to Bandura's social cognitive theory, *self-efficacy* is defined as "one's belief in their ability to organize and execute the actions required to produce a given achievement," which significantly contributes to various learning activities undertaken by students (Bandura, 2002). Self-efficacy has become a focus of numerous researchers in applied psychology and education across various countries, and all research findings confirm that self-efficacy has a positive relationship with students' academic success (Y. Wang et al., 2021). To date, students' self-efficacy has been included in various educational topic studies; hence, a scientific mapping in the field of self-efficacy is necessary to understand the evolution of self-efficacy research.

Several previous studies have found that self-efficacy can instill in students confidence in accomplishing tasks, coupled with maximal effort (Chen & Liang, 2022). Furthermore, it can

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qualitatively enhance school task completion (Chiang et al., 2022). As for educators, it can aid in implementing instructional models (Tseng et al., 2022). Scientific mapping is essential to discern the latest developments in heavily researched topics. Additionally, scientific mapping aims to identify research gaps that are useful in creating novelty in research.

*Bibliometric analysis* is a quantitative method used to analyze data and evaluate previous research outcomes. Specific analyses, such as keyword mapping, affiliations, countries, and authors, allow for assessing research topics related to self-efficacy. VosViewer is a software tool Prof. Van Eck (Leiden University, Netherlands) developed for mapping knowledge using a Java-based algorithm. This research aims to analyze the development of publications, countries with the highest publications and citations, analysis of journals with impact factors (IF) and the highest publications, analysis of highly cited authors, and an analysis of popular terms and keywords that constitute the primary topics in self-efficacy research.

## **METHODS**

### **Data source**

This research utilizes the database from dimensions.ai, employing the search string 'Self-Efficacy' AND 'Student Learning' AND 'Engagement.' The bibliometric analysis covers research on self-efficacy and student engagement from 2014 to 2023. Data retrieval from the literature database was conducted over one day, specifically on August 24, 2023. 2500 papers were collected and then screened based on a predefined research focus.

### **Inclusion and exclusion criteria**

The inclusion criteria for the selected publications encompass (1) literature with a focus on self-efficacy and student engagement; (2) articles specifically examining self-efficacy and student engagement; (3) articles published between 2011 and 2023; (4) literature indexed by the dimensions.ai database. The initial database search yielded 2500 documents. Exclusion criteria, conversely, involve (1) articles that have yet to be formally published and (2) documents from proceedings and conferences.

### **Analysis tools**

The data analysis in this research is conducted using bibliometric analysis. The software employed for this purpose is VosViewer version 1.6.18, developed by Leiden University, Netherlands. VosViewer is a computer program written in Java for creating science mapping. VosViewer can be used for bibliometric network analysis, including generating publication, author, or journal maps based on citation, co-citation, or bibliographic coupling networks. It can also be used to create keyword maps based on co-occurrence networks.

## **RESULT AND DISCUSSION**

### **Analysis of publication**

The research development concerning the topics of 'self-efficacy' and 'student engagement' has experienced significant growth in each period. This progression in research indicates that researchers continue to be interested in advancing and expanding studies related to self-efficacy and student engagement.

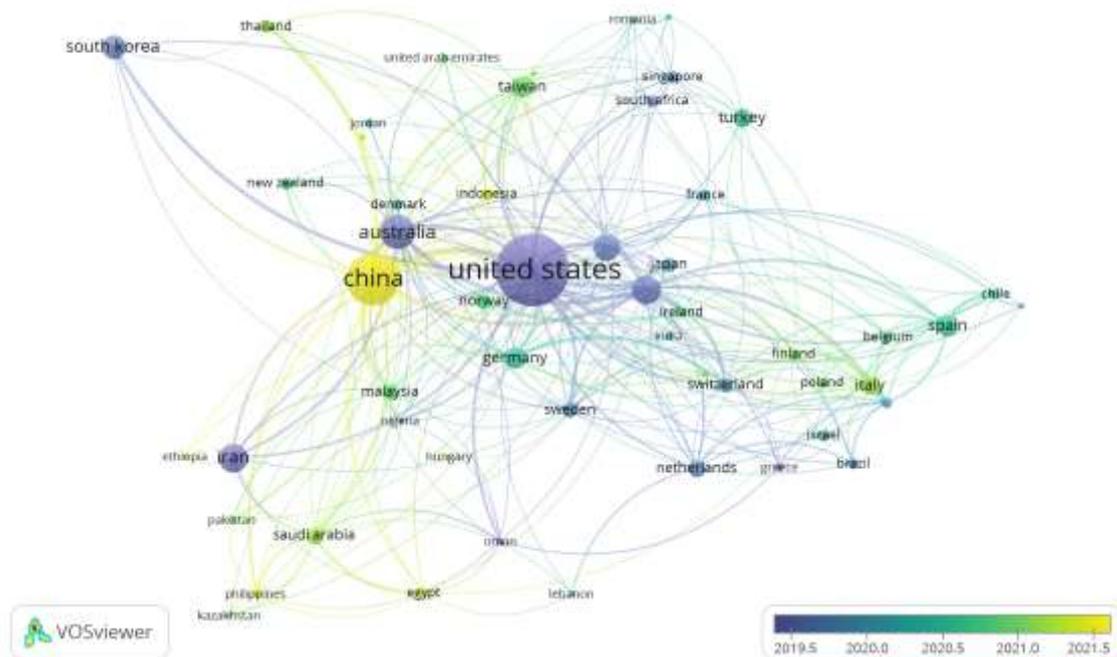
### **Analysis of countries**

Ninety countries were identified, and a minimum threshold of 5 documents per country was established. Consequently, only 54 countries met the minimum requirement of having five or more documents. Subsequently, through bibliometric analysis using VosViewer, the researchers identified the top five countries with the highest number of documents on research related to self-efficacy and student engagement. These countries are the United States of America (U.S.A., n=788), China (n=411), Australia (n=178), Taiwan (n=73), and Italy (n=54) (Figure 1). In VosViewer, the central panel with the most significant size represents items with higher values. (Van Eck & Waltman, 2012).

The United States of America (U.S.A.) leads the world in research documents on self-efficacy, with an average annual publication rate of 2019.34. However, China has the potential to develop this research topic further, as it is the most prolific country in scientific publications within cluster 4, particularly in the domains of self-efficacy and student engagement. China's average scientific publication rate is 2021.43, indicating its continuous development of research on self-efficacy and student engagement, followed by countries like Taiwan and Italy. In summary, within the research topics of self-efficacy and student engagement, there are two influential significant players: the United States of America and China. Table 1 displays the top five countries classified based on network size, documents, and average publications per year.

**Table 1.** Top 5 countries in terms of publications on the topic of self-efficacy and student engagement

| Num. | Countries | Cluster | Links | Documents | Avg. Pub. Year |
|------|-----------|---------|-------|-----------|----------------|
| 1    | USA       | 8       | 46    | 788       | 2019.34        |
| 2    | China     | 4       | 36    | 411       | 2021.43        |
| 3    | Australia | 3       | 26    | 178       | 2019.56        |
| 4    | Taiwan    | 4       | 16    | 73        | 2020.89        |
| 5    | Italy     | 1       | 20    | 54        | 2021.13        |

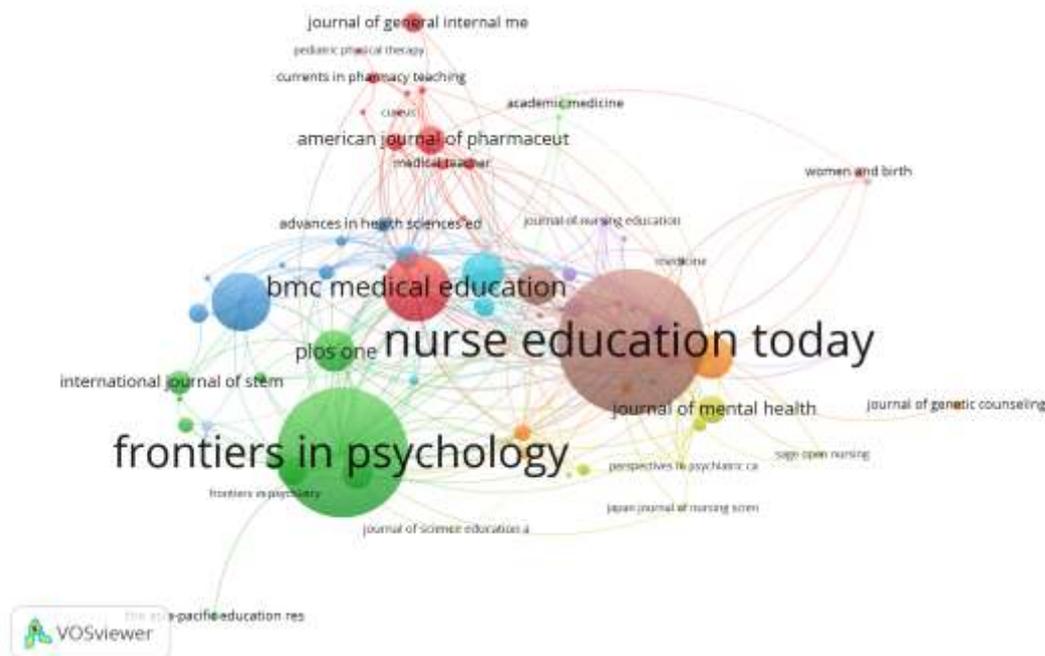


**Figure 1.** The visual representation map of country collaborations in researching self-efficacy and student engagement is depicted. The color variations among each circle indicate the collaboration periods among countries. Each circle representing a specific country with bright colors signifies recent collaborations, while circles with darker colors indicate collaborations over extended periods.

**Analysis of Journals**

All the reference articles were published in 657 different journals. The top five journals with the highest publication counts include Frontiers in Psychology (n = 293), Nurse Education Today (n = 139), International Journal of Environmental Research and Public Health (n = 97),

BMC Medical Education (n = 88), and PLoS One (n = 63), along with Education and Information Technologies (n = 31). Additionally, Table 2 lists the top 10 journals with the most citations.



**Figure 2.** Visualization map of journals publishing scientific articles on self-efficacy and student engagement

**Table 2.** Top 10 Journals with high Citation Counts

| Nu<br>m. | Cited Journal  | Clust<br>er | Citations<br>counts | IF<br>(2022) |
|----------|--|-------------|---------------------|--------------|
| 1        | Nurse Education Today                                    | 8           | 2890                | 171.61       |
| 2        | Frontiers in Psychology                                  | 2           | 2512                | 364.64       |
| 3        | BMC Medical Education                                    | 1           | 1101                | 110.19       |
| 4        | CBE-Life Sciences Education                              | 3           | 939                 | 56.48        |
| 5        | Nurse Education in Practice                              | 7           | 669                 | 59.30        |
| 6        | International Journal of Environmental and Public Health | 6           | 623                 | 113.01       |
| 7        | Plose One  | 2           | 616                 | 66.90        |
| 8        | Journal of Advanced Nursing                              | 4           | 581                 | 24.53        |
| 9        | American Journal of Pharmaceut                           | 1           | 381                 | 18.09        |
| 10       | Journal Mental Health                                    | 4           | 375                 | 19.14        |

**Analysis of Authors**

The scientific mapping of the article and cited authors is presented in Table 3. There are several significant authors in the field of research on self-efficacy and student engagement, and these authors have made substantial contributions to the advancement of knowledge. While many authors from previous periods are still prominent, some have even received Nobel Prizes due to their highly impactful roles. Authors with high impact based on matrix values include Leodoro J. Labrague, with an average citation year of 86.25, followed by Shefaly Shorey with 35.75, Young Sook Roh with 22.50, Cheng-Yu Chen with 13.33, and Cayetano Fernandez-Sola with 11.33.

**Table 3.** The top 5 authors with the highest average scientific publications

| Nu<br>m. | First Author's              | Clust<br>er | Lin<br>ks | Total Link<br>Strength | Documen<br>ts | Avg.Citati<br>ons |
|----------|-----------------------------|-------------|-----------|------------------------|---------------|-------------------|
| 1        | Leodoro J. Labrague         | 3           | 4         | 5                      | 4             | 86.25             |
| 2        | Shefaly Shorey              | 3           | 6         | 11                     | 4             | 35.75             |
| 3        | Young Sook Roh              | 3           | 1         | 2                      | 4             | 22.50             |
| 4        | Cheng-Yu Chen               | 1           | 6         | 10                     | 3             | 13.33             |
| 5        | Cayetano Fernandez-<br>Sola | 2           | 8         | 27                     | 6             | 11.33             |

Next, there are co-citations of cited authors presented in Table 4.

**Table 4. 5** The highest co-citation authors

| Num. | First Author's        | Cluster | Links | Total Link Strength | Citations |
|------|-----------------------|---------|-------|---------------------|-----------|
| 1    | Albert Bandura        | 1       | 50    | 6770                | 1165      |
| 2    | Frank Pajares         | 1       | 48    | 4358                | 352       |
| 3    | Barry J. Zimmerman    | 1       | 50    | 2638                | 326       |
| 4    | Richard M. Ryan       | 1       | 49    | 3267                | 279       |
| 5    | Jacquelynne S. Eccles | 1       | 48    | 4263                | 276       |

**Analysis of terms and keywords**

The keyword co-occurrence map was analyzed using VosViewer version 1.6.18 with 100 nodes. The top keywords are as follows: motivation (Keller & Szakál, 2021; Martin et al., 2023), followed by engagement (Galal et al., 2023), anxiety (Croy et al., 2020), academic performance (Salvo-Garrido et al., 2023), university student (Greco et al., 2022), academic self-efficacy (Zhu et al., 2023), burnout (Z. Wang & Zheng, 2023), student engagement (Yang et al., 2022), life satisfaction (S. Wang et al., 2023), and academic procrastination (Guo et al., 2019; Tian et al., 2023).

**Table 5.** The top keywords in the research topic of self-efficacy and student engagement

| Nu<br>m. | Keywords                    | Clust<br>er | Lin<br>ks | Total Link<br>Strength | Occurren<br>ces | Avg. Pub.<br>Year |
|----------|-----------------------------|-------------|-----------|------------------------|-----------------|-------------------|
| 1        | Motivation                  | 4           | 84        | 3117                   | 599             | 2020.66           |
| 2        | Engagement                  | 3           | 86        | 3019                   | 499             | 2020.82           |
| 3        | Anxiety                     | 2           | 78        | 2151                   | 410             | 2020.68           |
| 4        | Academic<br>Performance     | 4           | 73        | 1512                   | 265             | 2020.65           |
| 5        | University Student          | 2           | 69        | 1110                   | 227             | 2021.11           |
| 6        | Academic Self-<br>Efficacy  | 2           | 57        | 1664                   | 212             | 2020.97           |
| 7        | Burnout                     | 2           | 52        | 1091                   | 170             | 2021.61           |
| 8        | Student Engagement          | 3           | 60        | 600                    | 95              | 2021.07           |
| 9        | Life Satisfaction           | 5           | 31        | 443                    | 78              | 2021.99           |
| 10       | Academic<br>Procrastination | 2           | 14        | 334                    | 61              | 2021.34           |
| 11       | Teacher Support             | 5           | 23        | 379                    | 52              | 2021.73           |



|    |   |  |   |      |
|----|---|--|---|------|
| 7  | Understanding the Relationship between Parental Psychological Control and Prosocial Behavior in Children in China: The Role of Self-Efficacy and Gender | Fu, Wangqian (Fu et al., 2022)                     | International Journal of Environmental Research and Public Health     | 2022 |
| 8  | Self-efficacy and resilience as predictors of students' academic motivation in online education   | Abdolrezapour, Parisa (Abdolrezapour et al., 2023) | PLoS ONE  | 2023 |
| 9  | The predictive role of personality traits on academic performance of medical students: The mediating role of self-efficacy                              | Hayat, Ali Asghar (Hayat et al., 2020)             | Journal of the Islamic Republic of Iran                               | 2020 |
| 10 | The Influence of Online STEM Education Camps on Students' Self-Efficacy, Computational Thinking, and Task Value   | Chiang, Feng Kuang (Chiang et al., 2022)           | Journal of Science Education and Technology                           | 2022 |
| 11 | Non-traditional students' preferences for learning technologies and impacts on academic self-efficacy   | Sutherland, Karen (Sutherland et al., 2023)        | Journal of Computing in Higher Education                              | 2023 |
| 12 | Student Self-Efficacy in Pediatrics: Evaluation and Modification of the Pediatric Communication and Handling Self-Efficacy Scale                        | Wolden, Mitch (Wolden & Anderson, 2022)            | Physical Therapy  | 2022 |
| 13 | The impact of self-efficacy based prebriefing on nursing student clinical competency and self-efficacy in simulation: An experimental study             | Brennan, Brittany A. (Brennan, 2022)               | Nurse Education Today   | 2022 |
| 14 | Graduate student self-efficacy: Implications of a concept analysis  | Muñoz, Lauren R. (Muñoz, 2021)                     | Journal of Professional Nursing                                       | 2021 |
| 15 | Student Self-Efficacy, Classroom Engagement, and Academic Achievement: Comparing Three Theoretical Frameworks   | Olivier, E. (Olivier et al., 2019)                 | Journal of Youth and Adolescence                                      | 2019 |
| 16 | Impact of Self-Efficacy and Perfectionism on Academic Procrastination among University Students in Pakistan   | Ashraf, Muhammad Azeem (Ashraf et al., 2023)       | Behavioral Sciences   | 2023 |
| 17 | Relationships between Self-Efficacy, Job Instability, Decent Work, and Life Satisfaction in A Sample of Italian, Swiss, and Spanish Students            | Zammiti, Andrea (Zammiti et al., 2023)             | European Journal of Investigation in Health, Psychology and Education | 2023 |
| 18 | The relationship between perceptions of instructional practices and student self-efficacy in guided-inquiry laboratory courses                          | Beck, Christopher W. (Beck & Blumer, 2021)         | CBE Life Sciences Education   | 2021 |
| 19 | Self-efficacy and performance of research skills among first-semester bioscience doctoral students  | Lachance, Katherine (Lachance et al., 2020)        | CBE Life Sciences Education   | 2020 |
| 20 | Entrepreneurial self-efficacy among elementary students: the role of entrepreneurship education   | Saptono, Ari (Saptono et al., 2021)                | Heliyon   | 2021 |

## CONCLUSION

This bibliometric study represents the first on self-efficacy from 2014 to 2023. Through this research, we gain access to the development status of self-efficacy research over the past ten years. The topic of self-efficacy has seen significant growth, and this development is expected to continue across various fields of knowledge, including those beyond education. The United States of America leads in publications on self-efficacy, followed by China, Australia, Taiwan, and Italy. Furthermore, the journal with the highest citations is *Nurse Education Today*, followed by *Frontiers in Psychology*, *BMC Medical Education*, and *CBE-Life Sciences Education*.

This research provides insights into the evolution of self-efficacy research over the past decade. It lays the foundation for potential collaborations among authors, institutions, and countries, offering a guiding platform for selective publication outcomes. Additionally, the scientific mapping generated here has the potential to predict the future direction of self-efficacy publication trends. However, it is essential to note that this study has limitations, particularly regarding data sources, as it relies solely on dimensions.ai. Future research is advised to consider comparisons with other data sources, such as Scopus or Web of Science databases.

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