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A Bibliometric Analysis of Self-Regulated Learning Research Among Students: Trends, Themes, and Future Directions

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Abstract. This study uses bibliometric analysis to examine the development of research related to self-regulated learning. A total of 458 English-language articles indexed in the Scopus database and included in the field of psychology were analyzed using Biblioshiny from the Bibliometrix package in R. This program helps researchers map literature, analyze citations, and track research trends. The results of the study indicate a significant downward trend from 2015 to 2025, with the highest number of publications in 2021. Most of the articles were published in Germany, China, the United States, the Netherlands, and Spain. The journals that published the most articles on self-regulated learning include Frontiers in Psychology, Education Sciences, Learning and Individual Differences, Computers in Human Behavior, and Contemporary Educational Psychology. The most frequently used keywords in these articles were self-regulated learning, motivation, human, learning, and higher education. This study contributes by providing a comprehensive overview of the latest trends in self-regulated learning research. This study offers novel insights for researchers, practitioners, and policymakers regarding the trends and future directions of educational research, with a particular focus on Self-Regulated Learning.

Keywords: Learning, self-regulated learning, motivation, bibliometric, education

Abstrak. Penelitian ini menggunakan analisis bibliometrik untuk menganalisis penelitian *self-regulated learning*. Penelitian ini menganalisis 458 artikel berbahasa Inggris yang terindeks dalam basis data Scopus dan tergolong dalam bidang psikologi, dengan memanfaatkan Biblioshiny dari paket Bibliometrix dalam R, untuk menjalankan analisis bibliometrik yang komprehensif. Pemanfaatan program ini membantu peneliti untuk melakukan pemetaan literatur, analisis kutipan, dan pelacakan tren penelitian. Hasilnya menunjukkan tren penurunan yang signifikan dari tahun 2015 hingga tahun2025 dengan puncaknya di tahun 2021. Studi-studi ini sebagaian besar diterbitkan dan dipublikasikan di German,China, USA, Netherlands dan Spain. Selanjutnya jurnal atau publikasi yang paling sering menerbitkan artikel terkait topik *self-regulated learning* yakni di Frontiers In Psychology, Education Sciences, Learning and Individual Differences, Computers In Human Behavior dan Contemporary Educational Psychology. Kata kunci yang paling sering digunakan terkait penelitian ini adalah *self-regulated learning, motivation, human, learning dan higher education*. Penelitian ini memberikan kontribusi dengan menyajikan Gambaran secara menyeluruh mengenai tren terkini dalam penelitian mengenai *self-regulated learning*. Hasil studi ini berkontribusi dalam memberikan wawasan baru bagi peneliti, praktisi, serta pembuat kebijakan terkait tren dan arah perkembangan riset pendidikan, khususnya pada kajian *self-regulated learning*.

Kata kunci: Pembelajaran, sel-regulated learning, motivasi, bibliometrik, pendidikan

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Introduction

In recent decades, the concept of Self-Regulated Learning (SRL) has become one of the main focuses in educational psychology. This concept refers to the process that students go through, namely transforming their mental abilities into academic skills. Students actively manage their own learning process, involving cognitive, motivational, and behavioral aspects, so that they view learning as an activity that is beneficial to themselves. This view can then influence their response to the learning process. Self-regulation encompasses students' thoughts, feelings, and behaviors that are oriented toward a desired goal (Zimmerman, 2002). The meaning of

life indirectly influences students' self-regulated learning, and this process places greater emphasis on students' psychological capital (Feng et al., 2025). Students' self-assessment of their strengths and weaknesses, as well as their self-perception, is also an important aspect for students to develop Self-Regulated Learning (SRL) (Khoiriyah & Roberts, 2025). Additionally, gender, goals, task meaning, and self-confidence also influence the level of Self-Regulated Learning (SRL) in students (Wang et al., 2025).

Students' Self-Regulated Learning (SRL) can influence how they carry out their learning processes, especially for activities that involve a lot of online learning. Self-Regulated Learning (SRL) plays a role in reducing procrastination among students who undergo online learning (Hong et al., 2021). In the context of modern education today, the learning process places more emphasis on independence, which involves students' Self-Regulated Learning (SRL) abilities. Through an individual-oriented approach, it was found that variations in Self-Regulated Learning (SRL) among secondary school students contribute to differences in learning outcomes. Students' Self-Regulated Learning (SRL) can be measured both online and offline, taking into account the students' educational level to make predictions about their academic success more accurate (Ruhl et al., 2025).

Students with low levels of Self-Regulated Learning (SRL) activity tend to show lower academic performance (Van Alten et al., 2021). There is an influence on the increase in motivation confidence among students with high Self-Regulated Learning (SRL) (Granberg et al., 2021). The success of an individual's Self-Regulated Learning (SRL) is also influenced by several factors, one of which is the level of complexity of the material being studied (Wong et al., 2021) and the student's learning motivation (Ilishkina et al., 2022). There are four elements within motivation, including the motive for learning, mood, perception, and belief in one's own abilities. It is important for educators to understand students' Self-Regulated Learning (SRL) conditions so that they can help address students' academic problems (Srem-Sai et al., 2025).

Various intervention techniques can be used to improve students' Self-Regulated Learning (SRL) abilities, one of which is digital storytelling. This technique can strengthen the cognitive, motivational, emotional, and behavioral aspects of self-regulated learning, especially when students apply cognitive strategies such as planning, goal setting, research, imagination, and reflection (Gita et al., 2025). However, some domains of SRL have not been extensively studied, so further research is needed to understand the relationship between the two more comprehensively.

Research findings reveal that prospective teachers have a limited theoretical understanding of how to observe and support students' Self-Regulated Learning (SRL) skills and development (Latva-aho et al., 2024). As a follow-up, it is important to conduct further exploration to map research trends, identify patterns of relationships between concepts in the literature, and track the development of knowledge related to self-regulated learning. This study uses bibliometric analysis to describe the current state of Self-Regulated Learning (SRL) research in psychology, the most cited journals, and the most frequently used research topics, keywords, and themes. The research objectives are to answer the following research questions, (RQ1) How have publication trends related to Self-Regulated Learning (SRL) developed over the past decade based on data from Scopus? (RQ2) Which journals are the most productive and most cited in the field of Self-Regulated Learning (SRL) according to Scopus data? (RQ3) Who are the most influential authors, institutions, and countries in Self-Regulated Learning (SRL) research according to bibliometric analysis? (RQ4) What are the most frequently occurring topics, keywords,

Method

This study uses descriptive analysis with bibliometric analysis techniques to analyze research on self-regulated learning. Bibliometric analysis techniques are scientific methods that enable us to explore and analyze large volumes of scientific data (Donthu et al., 2021). Descriptive and evaluative bibliometric analysis was used in this study to identify trends in the literature related to the research focus according to several countries, languages, publication years, and scope of material (Güler, 2023). In this study, the analyzed data were extracted from the Scopus database, following the guidelines for systematic reviews and meta-analyses (PRISMA) (Moher et al., 2009), based on the consideration that the Scopus database provides access to high-

quality scientific articles, particularly those related to self-regulated learning. Bibliometric analysis was conducted using R. Bibliometrics is an R statistical package for analyzing and visualizing bibliographic data from the Wos and Scopus databases (Derviş, 2020).

Results and Discussion

This study uses a criterion sampling technique from the purposive sampling method. This study uses inclusion criteria in selecting articles to be included in this study. The inclusion criteria for this study are: (1) articles published up to July 11, 2025, (2) publications in English, (3) focus on the topic of self-regulated learning, (4) focus on the field of psychology, and (5) open access. Figure 1 presents a prism flow chart created based on these criteria.

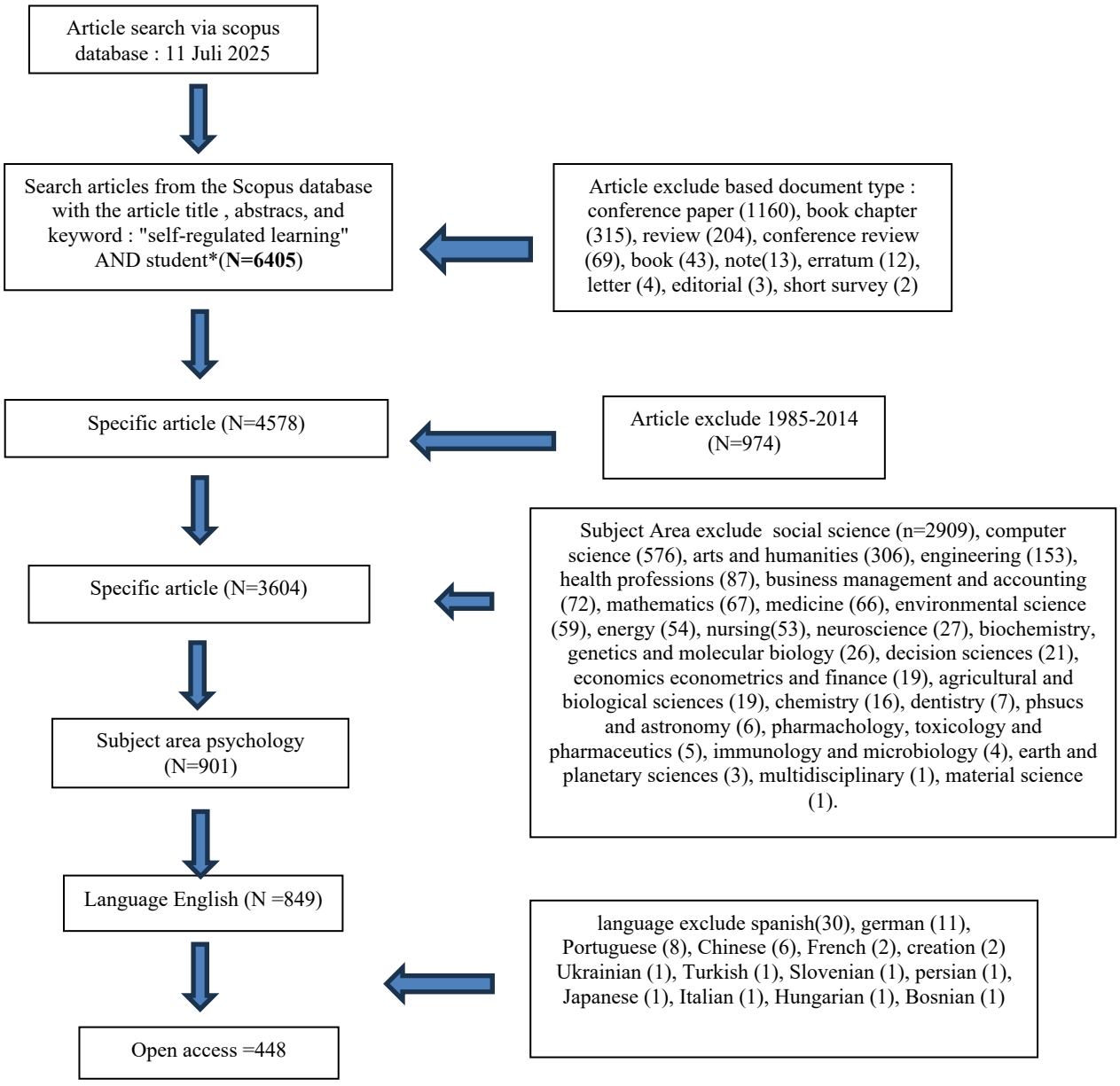

Figure 1. Flowchart for Self-Regulated Learning (SRL)

Table 1
Blibliometric Analysic

Basic Information About Blibliometric Analysic	
Time Span	2015-2025
Source of Articles	118
Document	448
Annual growth rate %	6.76
Average age of document	3.64
Average number of citations per article	19.66
DOCUMENT CONTENTS	
Keyword Plus (ID)	380
Author's Keywords (DE)	1261
AUTHORS	
Authors	1280
Single Author articles	40
AUTHOR COLLABORATION	
Single -author documents	42
Co-authors per article	3.69
International co-authorship %	26.12
DOCUMENT TYPES	
Articles	
Article, ARTICLE	444
	4

Referring to Table 1, there were 448 studies on Self-Regulated Learning (SRL) published between 2015 and 2025, with an average number of citations per study of 19.66. Of the total 1,280 authors, 40 studies were written by a single author. The visualizations in Figures 2A and 2B present the trends in average annual citations and the number of annual publications related to the topic of self-regulated learning.

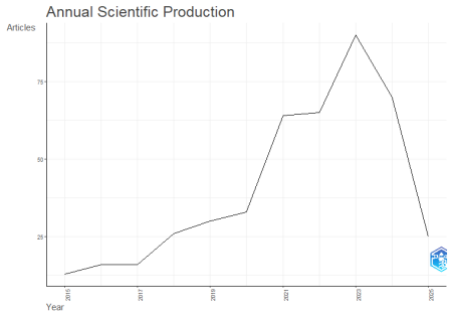

Figure 2. Annual Scientific Production

Figure 2 shows the annual scientific production trend related to Self-Regulated Learning (SRL) studies from 2015 to 2025. In general, there has been an increase in the number of publications from year to year, starting with a relatively low number in 2015, then increasing significantly starting in 2020 and peaking in 2023 with more than 90 articles published. However, there was a sharp decline in the number of publications in 2024 and 2025. This pattern reflects a surge in interest in the topic at the beginning of the decade, which then declined toward 2025.

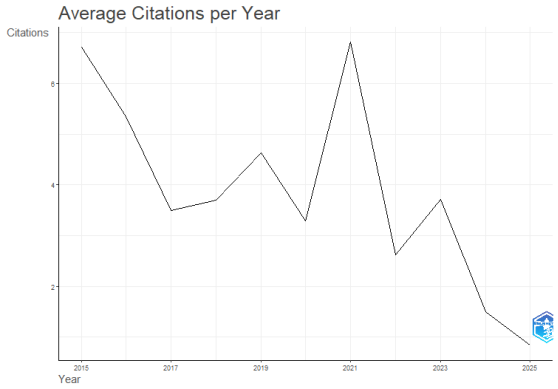

Figure 3. Graph for Annual Scientific Production

Figure 2 shows the average number of citations per year for publications discussing the variable Self-Regulated Learning (SRL) during the period 2015 to 2025. Overall, it can be seen that the number of citations fluctuated, but showed a downward trend in the last ten years. The year 2015 recorded the highest number of citations, indicating that publications related to SRL during the previous period had a significant influence on academic literature. A sharp decline occurred between 2015 and 2017, which may have been caused by a shift in research direction or increased attention to other issues that were more relevant at the time. Although there was a slight increase in 2019, the trend did not continue and appeared unstable. However, after 2021, citations declined sharply again, reflecting a decline in academic interest in the SRL theme.

In 2024 and 2025, the average citation rate dropped dramatically to near zero, possibly due to a lack of influential new publications or insufficient citation accumulation time. This trend indicates that although SRL was once a prominent topic, attention to it has begun to shift toward more contemporary issues. These findings provide important insights for researchers to reconsider the position and contribution of SRL in the development of educational theory and practice in the future.

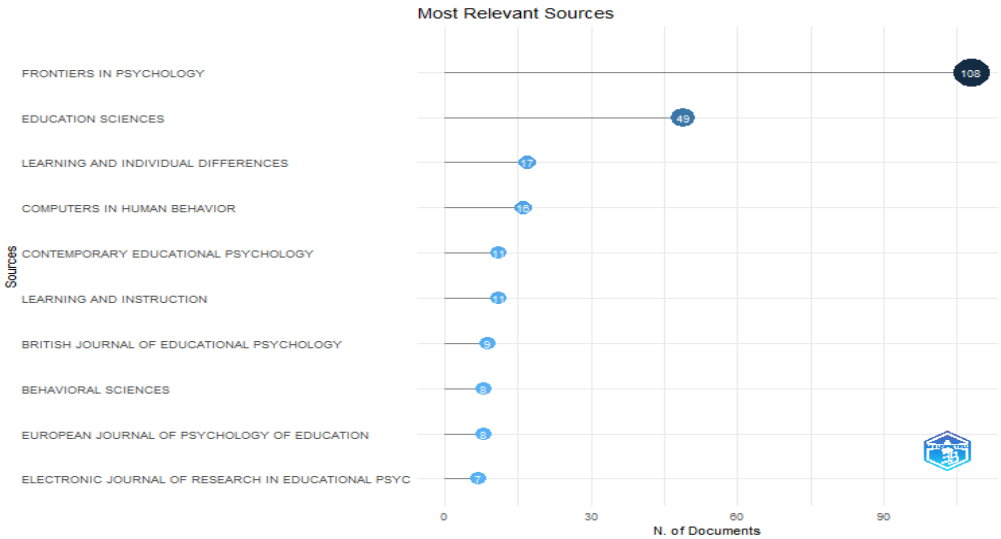

Figure 4. Graph of Most Revelant Sources

This figure shows the ten most relevant scientific publication sources in research related to Self-Regulated Learning (SRL) based on the number of citations and published documents. It can be seen that Frontiers in Psychology is the most dominant source with the highest number of documents reaching 108 publications,

although it has a relatively lower citation ratio per document compared to other journals. Meanwhile, Educational Psychology ranks second in terms of the number of documents (49), but has a stronger citation performance. Journals such as Learning and Individual Differences, Computers in Human Behavior, and Contemporary Educational Psychology also emerge as important sources that consistently contribute to the number of publications and citations in this field. The presence of these journals indicates that studies on SRL are widely discussed within the disciplines of educational psychology, educational technology, and individual learning. This information is highly useful for identifying target journals for researchers seeking to publish studies on Self-Regulated Learning (SRL) and for understanding the distribution of scientific literature on this topic.

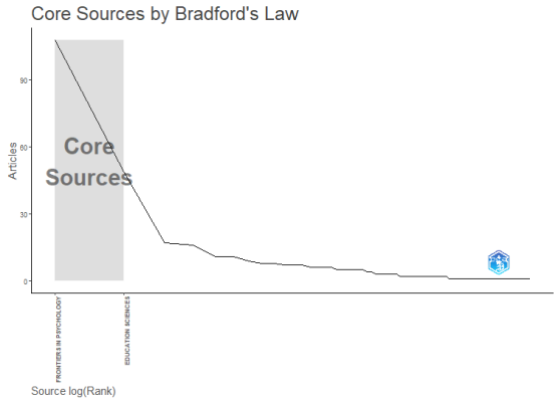

Figure 5. Graph of Core Sources

In this graph, it can be seen that the journals Frontiers in Psychology and Education Sciences are included in the core sources zone. These two journals contributed the highest number of articles compared to other journals in this study. After these two core sources, there was a sharp decline in the number of articles in other journals. These findings are useful for mapping primary literature sources and helping researchers determine priority journals for publication and literature reviews related to self-regulated learning.

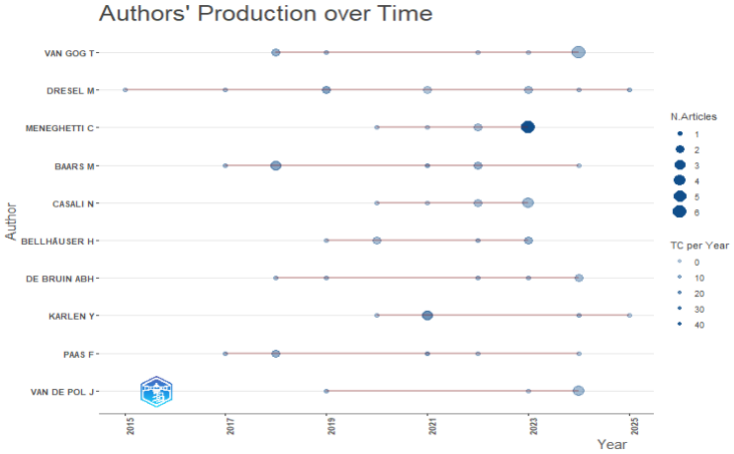

Figure 6. Graph of Author' Production over Time

From the graph, it can be seen that Meneghetti C is the most productive author, with a total of 6 articles and the highest citation rate for one of his publications. Other authors who have also made significant contributions in terms of the number of articles are Van Gog T, Casali N, and Baars M, each with several publications spread across several years. Additionally, Karlen Y has articles with a fairly high citation rate despite having fewer publications, indicating the significant impact of his work.

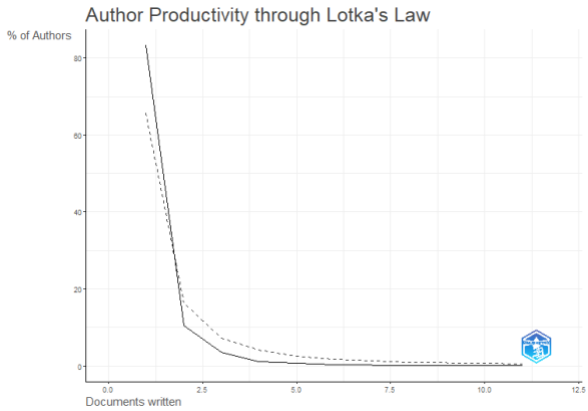

Figure 7. Curve of Author Productivity through Lotka's Law

The curve shows that the majority of authors write only one document (more than 80%), while only a small proportion write two or more. As the number of documents written increases, the percentage of productive authors declines sharply, reflecting a typical pattern in scientific publications where major contributions are made by only a few authors. The dotted line shows the theoretical distribution based on Lotka's Law, while the solid line represents the actual observed data. The agreement between the two indicates that the distribution of author productivity in the field of Self-Regulated Learning (SRL) tends to follow the pattern commonly observed in many other disciplines.

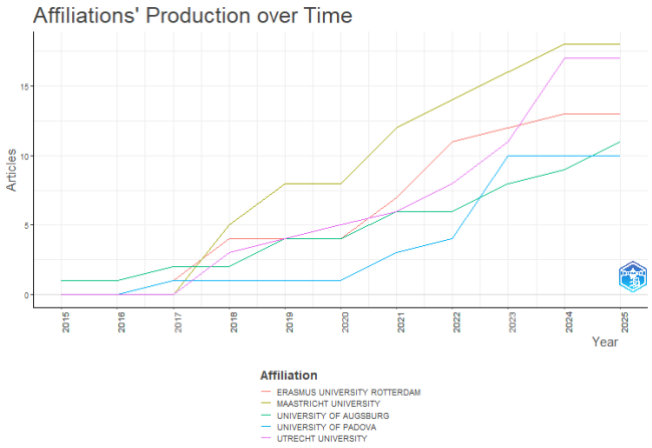

Figure 8. Graph of Affiliations Production Over Time

The graph shows that Maastricht University has the highest productivity and most consistent growth, reaching more than 15 articles in 2025. It is followed by Utrecht University and Erasmus University Rotterdam, which also show a steady upward trend, especially after 2020. Meanwhile, the University of Padova and the University of Augsburg show slower growth, but still experience significant growth towards 2025. This graph reflects the active contributions of European institutions to the development of literature on Self-Regulated Learning, as well as highlighting the evolving dynamics of collaboration and research focus within the international academic community.

Figure 9. Word Cloud Visualization from Self-Regulated Learning

The image is a word cloud visualization that displays the keywords that appear most frequently in the literature on self-regulated learning. The most dominant word is "self-regulated learning," indicated by the largest and boldest font size, signifying the highest frequency of occurrence. Surrounding it are other important terms such as motivation, metacognition, self-efficacy, learning, higher education, and students, which indicate supporting topics closely related to SRL research. The presence of these words illustrates that SRL cannot be separated from psychological aspects such as motivation and self-efficacy, as well as educational contexts such as self-directed learning in higher education. This word cloud provides an overview of the main focus and frequently used keywords in research on self-regulated learning, making it highly useful in the process of developing a theoretical framework or determining further research topics.

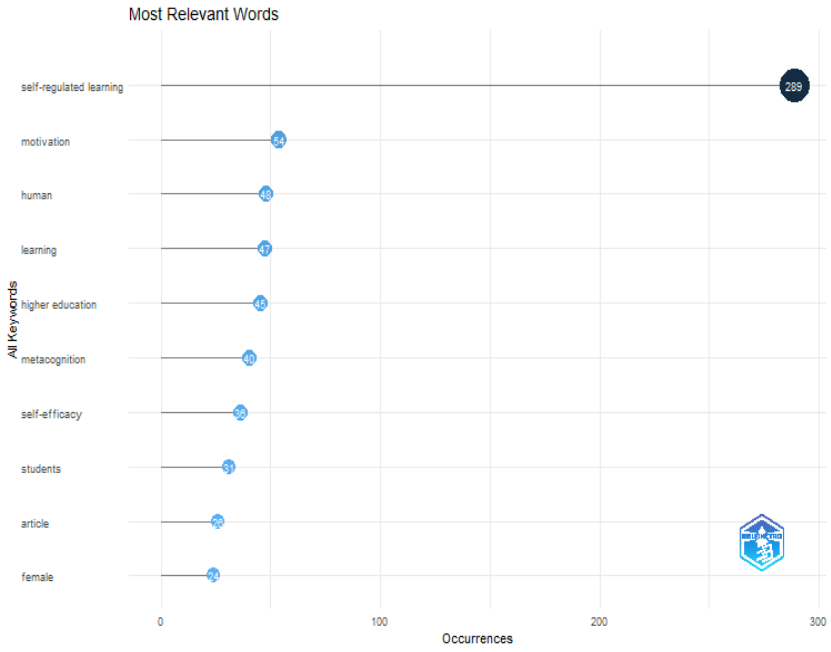

Figure 10. Graph of Most Relevant Words

This graph shows the keywords that appear most frequently in the analyzed documents, with the horizontal axis representing the number of occurrences. The keyword "self-regulated learning" ranks highest with 289 occurrences, indicating that this topic is the main focus of the study. Other keywords such as motivation (54), lesson (48), learning (47), higher education (45), metacognition (40), and self-efficacy (36) also appear significantly, reflecting that these topics are closely related to self-regulated learning. This graph helps identify the key themes that are the focus of the research, while also showing the conceptual relationship between Self-Regulated Learning (SRL) and psychological and contextual aspects in education.

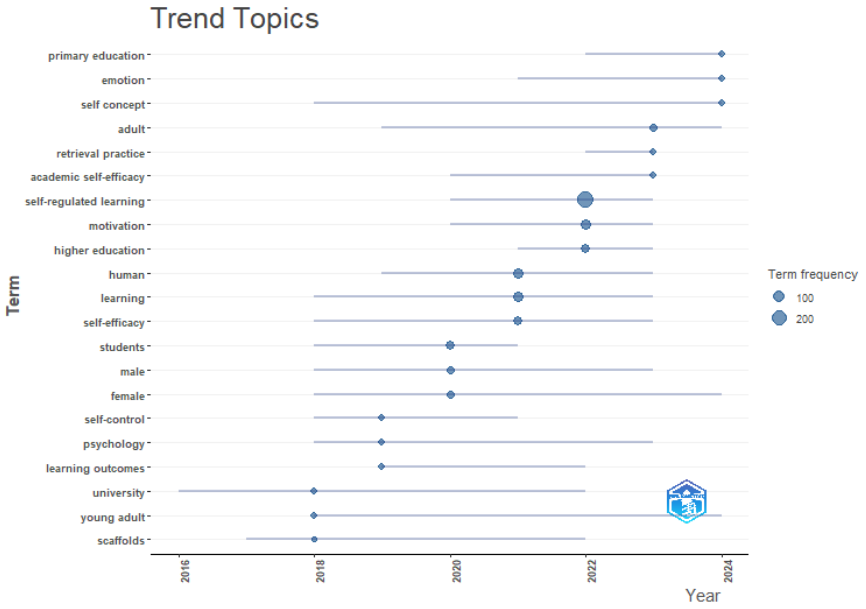

Figure 11. Graph of Trend Topics

The figure above shows a "Trend Topics" graph illustrating the development of topics that frequently appear in research related to Self-Regulated Learning (SRL) from 2016 to 2024. Each line represents the time period during which a term appeared, while the size of the circle indicates its frequency of appearance—the larger the circle, the higher the frequency. It is evident that topics such as self-regulated learning, motivation, and academic self-efficacy dominated in 2022, indicating a peak in researchers' attention to these issues. Other topics such as emotion, primary education, and self-concept have begun to receive more attention in recent years (2023–2024), indicating a shift or expansion in the focus of this research. This visualization helps to observe the dynamics and evolution of key themes in the academic literature related to self-regulated learning.

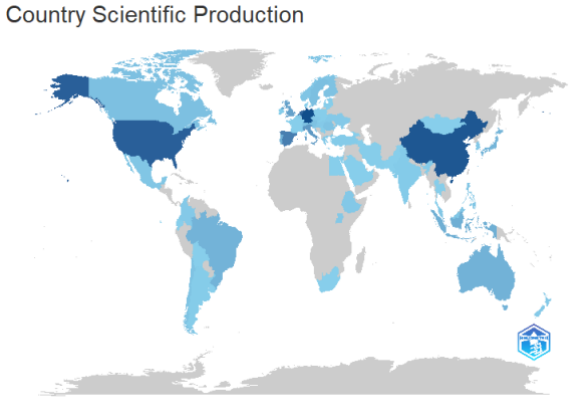

Figure 12. Country Scientific Production

The image above shows a world map depicting scientific production by country in the field of self-regulated learning. The blue color on the map represents the level of scientific contribution, with darker shades indicating a higher number of publications from that country. It is evident that the countries with the largest contributions are the United States, China, the United Kingdom, Germany, and Australia, marked by dark blue. Meanwhile, other countries such as Indonesia, Brazil, India, and several other European and Asian countries also contribute, albeit in smaller numbers. This map provides an overview of the geographical distribution of research in the field of Self-Regulated Learning (SRL) and highlights the continued dominance of scientific production in developed nations.

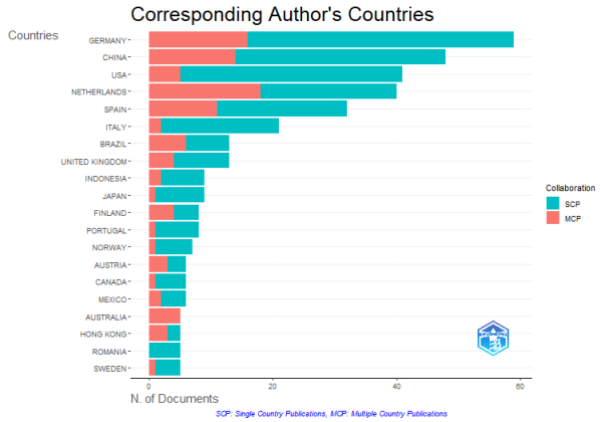

Figure 13. Corresponding Author's Countries

The figure above shows the distribution of the countries of origin of authors of scientific publications on self-regulated learning, as well as the types of collaboration undertaken. The graph distinguishes between SCP (Single Country Publications), which are publications written by authors from a single country (marked in blue), and MCP (Multiple Country Publications), which are publications resulting from international collaboration (marked in pink). Germany is the country with the highest number of publications, followed by China, the United States, and the Netherlands. It is evident that most publications originate from collaborations within a single country, although some countries like the Netherlands and Spain also demonstrate significant contributions through international collaborations. Indonesia also contributes to this list, with most publications being SCP, indicating strong local research activity. This graph provides an overview of the global role of countries in the development of Self-Regulated Learning (SRL) research, as well as their level of involvement in international collaborations.

The results of the bibliometric analysis are presented visually in graphs and tables to facilitate data interpretation. A descriptive and evaluative bibliometric approach was applied to comprehensively examine the research topic, using the term 'self-regulated learning' as a search keyword in the Scopus database. This study was based on 448 studies that were selected according to specific criteria. The analysis process was conducted using R software through the Biblioshiny interface. The results show that publications in this field of study between 2015 and 2025 originated from 118 sources. A total of 1,280 authors were involved, with 40 studies written by a single author, and an average of 3.69 co-authors per study.

The year 2021 showed a surge in publications related to this research, which was most likely influenced by the increase in online learning practices due to the COVID-19 pandemic during that period. During the lockdown due to the pandemic, the number of students participating in online learning increased, but the effectiveness of online learning became a concern at that time. Several studies focused on the effectiveness of online learning, and the studies showed that online learning is greatly influenced by students' ability to regulate themselves in learning, including task strategies, time management, and self-evaluation (Hong et al., 2021).

Based on Bradford's law, Frontiers in Psychology, Education Sciences, and Learning and Individual Differences are the most productive journals in publishing articles on Self-Regulated Learning (SRL) compared to other journals. These journals rank in the top three in terms of publications, H-index, total

citations, and publication rankings. They are followed by Computers in Human Behavior, Contemporary Educational Psychology, and several other journals. It is crucial for new researchers in Self-Regulated Learning (SRL) to follow these journals. Meneghetti C, Van Gog T, Casali N, and Baars are authors who have made significant contributions to the topic of "self-regulated learning." Meanwhile, Karlen Y has articles with a high citation rate despite having few publications. It is believed that the works of these authors will be important for researchers interested in following the literature on self-regulated learning.

The keyword "self-regulated learning" is the most frequently used in the literature, along with other terms such as motivation, metacognition, self-efficacy, learning, higher education, and students, which indicate supporting topics closely related to Self-Regulated Learning (SRL) research. This indicates that the concept of Self-Regulated Learning (SRL) is closely related to these psychological aspects. These keywords are often used as references in Self-Regulated Learning (SRL) research in selecting theories or subsequent research topics. This study utilizes the Scopus database as its sole data source. Bibliometric studies using other databases can be used as a comparison for this research. Additionally, results obtained through various tools such as VOSviewer, CiteSpace, or other bibliometric analysis tools not used in this study can also be compared with the findings obtained.

Conclusion

This blibliometric study provides a comprehensive overview of research trends in Self-Regulated Learning (SRL) over the last decade. The analysis demonstrates that Self-Regulated Learning (SRL) has become a central construct in educational psychology, strongly associated with motivation, meta metacognition, self-efficacy, and learning outcomes, particularly in the context of online and independent learning. The findings answer the research objectives by showing that publication trends in Self-Regulated Learning (SRL) have grown significantly, with peaks in productivity influenced by global shifts in education, such as the COVID-19 pandemic. Key journals, authors, institutions, and countries have been identified as leading contributors, mapping the intellectual structure of Self-Regulated Learning (SRL) research.

Importantly, this study highlights the novelty that Self-Regulated Learning (SRL) not only predicts academic achievement but also plays a critical role in reducing procrastination and enhancing digital learning engagement, thereby contributing to the advancement of psychology as a science and practice. Future research is encouraged to expand beyond descriptive bibliometric analysis by integrating comparative studies across multiple databases and analytical tools to strengthen validity. In addition, more nuanced investigations into underexplored domains of Self-Regulated Learning (SRL) such as emotional regulation, cultural contexts, and digital storytelling interventions—would enrich theoretical development and practical applications. Researchers and educators should continue to refine strategies that foster self-regulated learning, particularly in digital and hybrid learning environments, to address emerging educational challenges.

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