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# A Bibliometric Analysis of Turkish Educational Sciences in the Context of Education and Science Journal

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This study aims to provide a bibliometric overview of the publication and citation trends of the Education and Science Journal (ESJ), one of the most prestigious and longstanding international journals in the field of educational sciences in Türkiye, which has been in publication for 48 years since 1976. The study covers the period from 2007, when ESJ began to be indexed by Web of Science (WoS), to the present day, and it aims to provide researchers with insights and understanding specific to the journal regarding the current status and development of the field of educational sciences in Türkiye. Metadata for a total of 1270 articles published in the journal during this period were obtained from the WoS database. The study includes bibliometric analyses such as the total number of publications and citations, h-index, citations per paper, average number of citations per year, citation thresholds, and total link strength for ESJ between 2007 and 2022. In addition, the study presents visual maps that are generated on the basis of bibliometric mapping analysis conducted using VOSviewer software, including co-authorship, and co-occurrence of author keywords analyses. The results indicate that ESJ has significantly developed over time, enjoys a significant national authorship network, and that in recent years, researchers publishing in ESJ have been focusing on research topics such as action research, mixed methods, meta-analysis, middle school students, social sciences, and mathematical literacy.

## Introduction

Machlup (1962) states that the 20th century witnessed an explosion in digital information and communication technologies, leading to the emergence of the concept of "information society". The ways in which people think, feel, behave, communicate, and acquire knowledge in information societies vary depending on the technologies they possess (Akturk & Sahin, 2010). Research on themes central to science in information societies is presented to individuals through visual-written tools or internet networks. To effectively, rapidly, and reliably convey the findings of these studies to researchers working in the same field, it is necessary to utilize scientific journals (Bacanak et al., 2011). Being the most

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influential components of scientific life in the current era, scientific journals serve as online sharing platforms for the scientific community (Eraslan & Çakıcı, 2011). Consequently, pioneering institutions and universities publish emerging research using digital platforms or printed journals. The inclusion of scientific information as a whole in digital or printed publications substantially increases and facilitates access for all researchers in need of this information. Therefore, scientific journals play a critically important role in the development of science (Arık & Türkmen, 2009) and serve as significant communication systems that reveal the intellectual nature of specific scientific knowledge networks (Garfield, 1972). In this context, Education and Science Journal (ESJ), which began its publication life in 1976 under the auspices of Turkish Educational Association (TEA), is one of the journals of this kind.

In this study *Education and Science Journal* (ESJ) was chosen as the focus of bibliometric analysis due to its longstanding contribution to the field of educational sciences in Türkiye and its international recognition. As a journal indexed in several prominent scientific academic databases such as Web of Science (since 2007) and Scopus (since 2008), ESJ serves as a critical platform for disseminating research findings to a broad audience. Its inclusion in these databases amplifies the visibility and impact of the studies it publishes, making it an ideal source for analyzing trends and developments in educational sciences (Krauskopf, 2018). Furthermore, the journal's commitment to fostering high-quality educational research aligns with the aim of this study to provide comprehensive insights into the intellectual landscape of educational sciences through bibliometric analysis.

In today's world, as in other fields of science, the rapid accumulation of knowledge in the field of educational sciences creates an expectation for the systematic review of high-quality articles in this field. To meet this expectation, many researchers conduct studies that systematically review or meta-analyze research in relevant areas, including Mathematics Education (Bray & Tangney, 2017; Pan, Ke, & Xu, 2022), Science Education (Lin, Lin, & Tsai, 2014; Turan, 2023), Language Education (Lee, 2023; Turan & Akdag-Cimen, 2020), Engineering Education (Ahern et al., 2019; Brown et al., 2015), Medical Education (Cheston et al., 2013; Crowley, Ball, & Hiddink, 2019), and Music Education (Bond, 2017; Yang & Welch, 2022). The reviews cited above were conducted based solely on systematic reviews or systematic reviews combined with meta-analyses in a specific educational area. A systematic review study conducted using meta-analysis or manual coding methods inherently suffers from certain limitations. Among the most prominent of these limitations are the fact that the number of articles examined is limited and that by its nature manual coding, the dominant approach adopted in studies, is exhaustive, tedious, and tiresome, which makes it prone to errors. Therefore, to eliminate the limitations of existing review studies and provide a comprehensive overview of the trends in the field of educational sciences, an appropriate review method must be used that is suitable for large bibliometric datasets obtained from a representative journal (Chen et al., 2020).

The increasing number of scientific studies in a field limits the comprehensive examination of the accumulated knowledge in that field. Therefore, the bibliometric analysis method is widely preferred to address this issue (Kurutkan & Orhan, 2018). Pritchard (1969) defined bibliometrics as the application of mathematical and statistical methods to books and other communication media. Bibliometric analysis is an appropriate method for dealing with large-scale data sets as the scientific literature data has reached gigantic dimensions, especially in recent years, as a result of their continuous growth and the widespread use of big data (Beelen et al., 2017). According to Chen et al. (2020), bibliometric analysis is an important tool for

measuring and evaluating the results of academic research in a specific field.

Bibliometric analysis has also been used to examine changing perspectives, theories, expressions, interpretations, findings, and practices in a specific journal (Chen et al., 2019). In recent years, many journals have adopted the bibliometric examination of their publications, especially to commemorate a special occasion (Chen, Zou, & Xie, 2020). For instance, Cobo et al. (2015) analyzed the first 25 years of Knowledge-Based Systems, Merigó et al. (2015) examined the period from 1973 to 2014 for the Journal of Business Research, Zawacki-Richter and Naidu (2016) reviewed the first 35 years of Distance Education, Merigó et al. (2017) investigated the initial 30 years of the International Journal of Intelligent Systems, Merigó et al. (2018) analyzed all documents published in Information Sciences between 1968 and 2016, Zawacki-Richter and Latchem (2018) reviewed all documents published in Computers & Education from 1976 to 2016, Bond, Zawacki-Richter, and Nichols (2019) assessed the first 50 years of the British Journal of Educational Technology, Chen et al. (2019) examined articles published in Computers & Education from 1978 to 2018, Chen et al. (2020) assessed articles published in Computers & Education from 1976 to 2018 in terms of subject, Chen, Zou, and Xie (2020) reviewed the 50 years of the British Journal of Educational Technology based on topic modeling, and Akturk (2022) conducted a bibliometric analysis of 1305 articles published in the Computer Assisted Learning journal between 1985 and 2020.

ESJ, as stated on its website (Retrieved January 14, 2024, from http://egitimvebilim.ted.org.tr/index.php/EB/pages/view/guideForAuthors#journalAim), is a leading international peer-reviewed journal in the field of educational sciences in Türkiye, published with the aim of contributing to the establishment of an education system where every individual in our country in particular and in the world at large can acquire the knowledge and skills they need. In its founding year of 1976, ESJ published 4 issues and, except for the year 1979 (when it published 5 issues), it published 6 issues annually from 1977 to 1986. The journal published 2 issues in 1986, and then it established the tradition of publishing 4 issues annually, which continues to this day. ESJ, which is indexed by leading scientific academic databases such as Web of Science (since 2007) and Scopus (since 2008), has a strong impact in Türkiye and the international scientific community. According to the 2022 Journal Citation Reports of Web of Science, owned by Clarivate Analytics (updated on June 28, 2022), the journal's impact factor is 0.500. ESJ is the only journal based in Türkiye listed in the Education & Educational Research category of Web of Science Core Collection, ranking 255th among 269 journals in this category. According to the SCImago Journal & Country Rank of Scopus (based on April 2023 data), the journal's impact factor is 0.234, ranking 998th out of 1543 journals in the Social Science/Education category. Undoubtedly, being indexed by one or both of these databases enables the research published in the journal to reach a wide audience of researchers, thereby increasing authors' citation rates and impact (Krauskopf, 2018).

Due to the strengths and weaknesses inherent in different methods of bibliometric analysis, it has become a general tendency in bibliometrics to combine various methods to explore research trends in a specific discipline or journal (Chang, Huang, & Lin, 2015; Leung, Sun, & Bai, 2017). In addition to bibliometric analyses such as total number of articles and citations, h-index, citations per article, annual citation count, citation threshold, and annual citation average, the use of a bibliometric mapping analysis can deepen bibliometric analysis and help visualize relationships between concepts, thereby making the analysis clearer and more understandable (Wallace & Fleet, 2012). One of the software tools that can be used to

graphically map bibliometric data is VOSviewer (Van Eck & Waltman, 2010). VOSviewer creates visual maps based on citation, co-citation, bibliographic coupling, co-authorship, and co-occurrence analyses derived from bibliometric datasets (Van Eck & Waltman, 2014). In this context, the aim of this study is to conduct a bibliometric analysis of articles published in ESJ, which is one of the most prestigious and longstanding journals in the field of educational sciences in Türkiye. A bibliometric map of the journal has been created using metadata from Web of Science, encompassing publications from the year 2007, when ESJ began to be indexed, until the present. This study is intended to provide researchers with insights and understanding specific to the development and status of educational sciences in Türkiye through the lens of ESJ. To achieve this goal, the study focuses on the research questions provided below:

(1) How is the publication and citation structure of ESJ?
(2) Who are the prominent authors and institutions in ESJ?
(3) How is the co-authorship of the authors publishing in ESJ?
(4) How is the co-occurrence of author keywords in ESJ publications?

## Method

### *Research design*

In this study, the bibliometric mapping method was used to examine the publication and citation structure of ESJ in WoS, determining the institutions and authors contributing most to the journal, and analyze the keywords used in the publications of the journal. Bibliometric mapping allows for the examination of research conducted by researchers and institutions in a specific field or journal, thereby facilitating the identification of trends in the field.

### *Identification of sources*

Today, there exist many databases in order to conduct bibliometric research by accessing data related to scientific publications. The most important ones among these databases include WoS, Google Scholar, Scopus, MEDLINE, PubMed, and the like (Chen, 2017). In this study, the WoS database, which is considered to be the most reputable indexed database for scientific publications, was chosen to examine ESJ bibliometrically (Li, Rollins, & Ran, 2018). WoS, published annually by Clarivate, is a prestigious database due to its extensive coverage in the field of education and hosts publications listed in the Journal Citation Reports (JCR) (Zhu & Liu, 2020). Clarivate's WoS is widely used today by administrators and international organizations for academic ranking or performance evaluation purposes (Clarivate, n.d.). WoS consists of eight different citation databases that collect information from journals, conferences, reports, books, and book series, providing researchers with a wide range of document types. Therefore, it is possible to examine various document types in WoS in terms of bibliometric characteristics (Sönmez, 2020).

The query provided In Figure 1 was used to access the dataset needed to conduct the bibliometric analysis of publications published in ESJ from 2007, when ESJ began to be indexed by WoS, to 2022. The dataset that was obtained through the query above contains metadata for a total of 1270 publications.

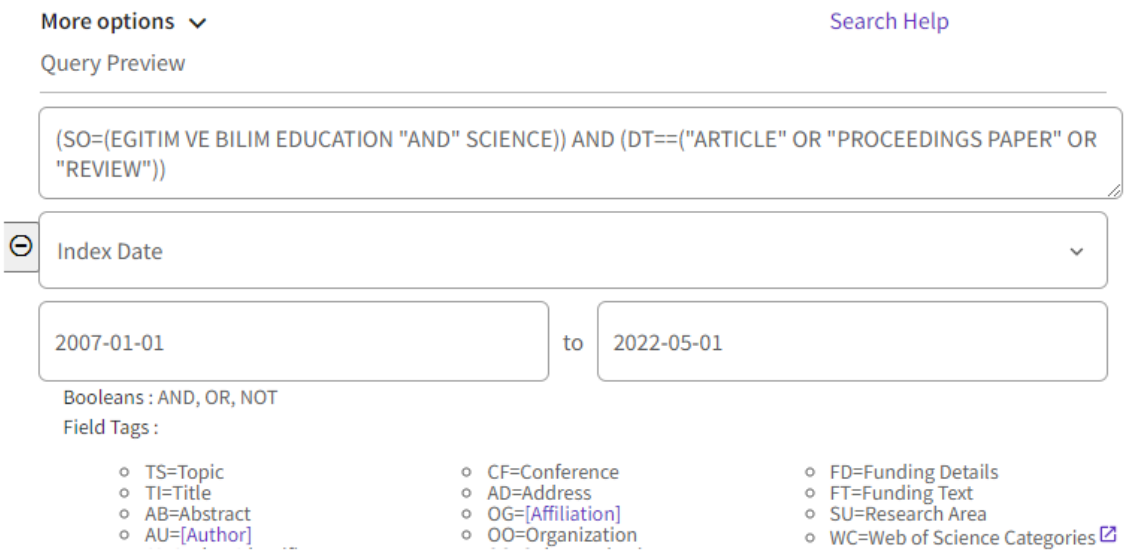


Figure 1. The search conducted in WoS database for bibliometric analysis

The dataset obtained through the query in Figure 1 includes metadata for a total of 1270 publications. To ensure the reliability and focus of the bibliometric analysis, inclusion and exclusion criteria were applied during the dataset creation process. Specifically, only articles and review papers indexed in WoS were included in the dataset, while other document types, such as editorials, corrections, and conference abstracts, were excluded.

The query parameters were also configured to focus on publications from 2007 to 2022, as ESJ began being indexed in WoS in 2007. Publications outside this timeframe or not classified under the relevant research categories in WoS were excluded. This ensures that the dataset accurately reflects the scope and characteristics of ESJ publications during the selected period.

### *Data extraction and cleaning*

Following the search conducted in the WoS database in accordance with the purpose of this study, the necessary dataset for bibliometric analysis was obtained in .TXT format. In bibliometric analysis, meta-data obtained from a database may contain multiple expressions for the same term, and conducting analyses without rationalizing these terms can lead to incorrect results (Nguyen & Hallinger, 2020). In this study, it was observed that different expressions were used for the same term in the dataset obtained from WoS. For example, the list of keywords contained different expressions for the same term, such as ‘self-efficacy,’ ‘self efficacy,’ and ‘meta-analysis,’ ‘meta analysis.’ To address this ambiguity, a process of resolving data uncertainty was conducted before analyzing the data (Strotmann & Zharo, 2012; Van Eck & Waltman, 2019). For this purpose, the .TXT file downloaded from the database was uploaded to VOSviewer, and preliminary analyses were conducted to identify different expressions used for the same term. Once the different expressions for the same term were identified, data cleaning was performed using OpenRefine software to prepare the metadata for analysis.

### *Data analysis tools*

In this study, a variety of software tools were used for storing, cleaning, analyzing, and visualizing the metadata obtained from the WoS database for bibliometric analysis of

ESJ. Microsoft Excel software was used for storing the metadata and conducting descriptive data analysis. OpenRefine 3.4.1 software (available at http://openrefine.org/) was utilized for data cleaning purposes. Additionally, VOSviewer 1.6.18 software (accessible at https://www.vosviewer.com/download) was employed to visualize bibliometric data.

### *Data analysis*

In the bibliometric analysis of ESJ, various metrics were examined including total number of publications and citations, h-index, citations per publication, citation threshold, annual average citation, and total link strength. In addition, in institutional-level analyses, the current rankings of these institutions in Türkiye and globally were presented according to University Ranking by Academic Performance (URAP) and Academic Ranking of World Universities (ARWU). Furthermore, using VOSviewer software, visual bibliometric maps were created by analyzing co-authorship, and co-occurrence of author keywords.

In this context, articles that have been published in the journal from the year 2007, when it was indexed by WoS, until the present were accessed from the WoS database, and a bibliometric analysis was conducted in terms of total publications and citations, h-index, citations per publication, citation threshold, annual average citations, and total link strength. In addition, a bibliometric mapping analysis was performed using VOSviewer software (Van Eck & Waltman, 2010), based on co-authorship, and co-occurrence of author keywords, resulting in visual maps. Co-authorship indicates the number of documents authored by multiple authors or institutions and shows how they are connected (Martínez-López et al., 2018). Co-occurrence of author keywords identifies the most frequently used keywords in the analyzed documents and those that are more commonly seen together in the same documents (Merigó et al., 2018).

## Results

### *How is the publication and citation structure of ESJ?*

With this research question, the publication and citation structure of ESJ was investigated. To achieve this, the following aspects were examined respectively: the evolution of ESJ in terms of publication types over time and the annual citation structure.

#### *The evolution of ESJ in terms of publication types over time*

The development of publication types in ESJ over time was examined, and it was observed that a significant advancement had taken place in this regard since 2007, when the journal began to be indexed in WoS. Figure 2 illustrates the distribution of publication types over the years.

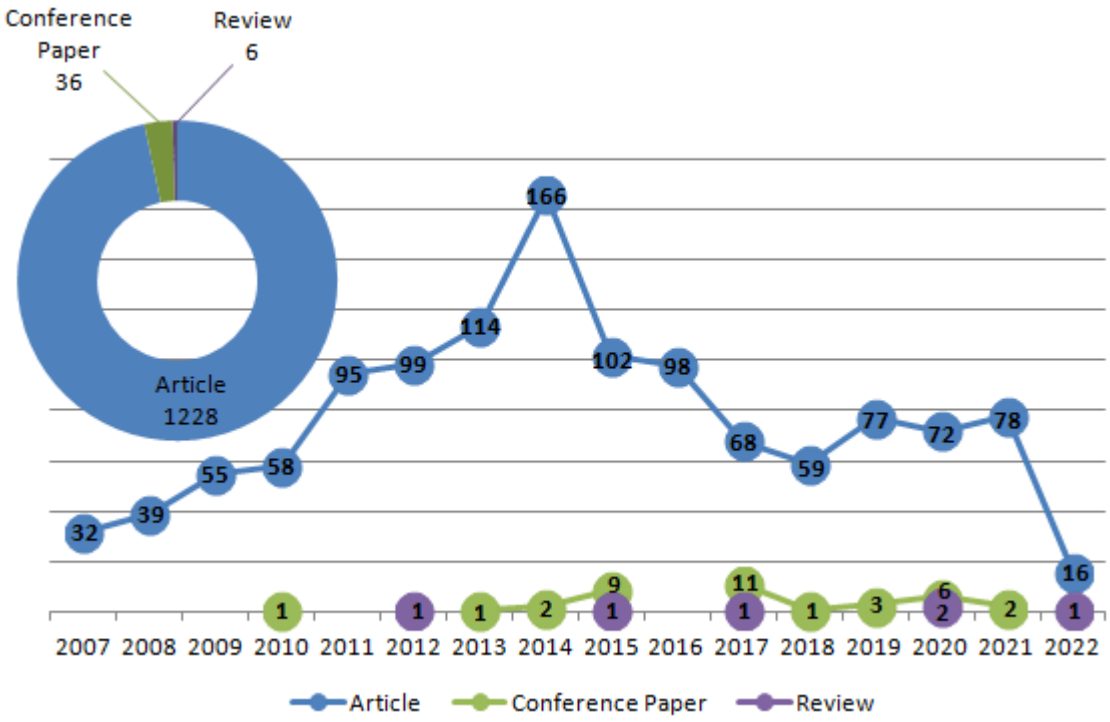


Figure 2. The evolution of ESJ in terms of publication types over time

As can be seen in Figure 2, out of the 1270 publications included in the database, 1264 are articles (36 of these articles were presented as conference papers and indexed as articles by WoS), and 6 consist of reviews. Notably, a decrease in the number of studies can be observed in recent years. This decline may be attributed to several factors, including the potential impact of global events such as the COVID-19 pandemic, changes in the journal's editorial policies leading to increased selectivity, or shifting preferences among researchers towards other journals (Parlar & Kart, 2022).

It should also be noted that the data for 2022 includes only publications indexed in WoS up until June, which may partially explain the observed decrease in publication numbers. Furthermore, the upward trend in earlier years can be linked to the journal's increasing visibility and quality requirements following its inclusion in WoS in 2007, encouraging more researchers to submit their work.

*The annual citation structure of ESJ*

The citation count of publications in ESJ over the years has been examined considering various citation thresholds. The structure of citations to the journal and its development over the years is shown in Table 1.

Table 1. Annual citation structure of ESJ

| Year | TP | TC | CPP | ≥50 | ≥25 | ≥10 | ≥5 | ≥1 |
|---|---|---|---|---|---|---|---|---|
| 2007 | 32 | 161 | 5.03 | 0 | 1 | 5 | 14 | 24 |
| 2008 | 39 | 322 | 8.26 | 0 | 1 | 13 | 25 | 38 |
| 2009 | 55 | 506 | 9.20 | 1 | 4 | 18 | 33 | 49 |
| 2010 | 59 | 402 | 6.81 | 0 | 1 | 14 | 37 | 57 |
| 2011 | 95 | 707 | 7.44 | 1 | 2 | 28 | 55 | 90 |
| 2012 | 100 | 503 | 5.03 | 0 | 2 | 17 | 38 | 90 |
| 2013 | 115 | 522 | 4.54 | 0 | 1 | 16 | 39 | 101 |
| 2014 | 168 | 841 | 5.01 | 2 | 5 | 18 | 55 | 140 |
| 2015 | 112 | 443 | 3.96 | 0 | 1 | 7 | 35 | 95 |
| 2016 | 98 | 364 | 3.71 | 0 | 0 | 6 | 28 | 88 |
| 2017 | 80 | 263 | 3.29 | 0 | 0 | 3 | 19 | 64 |
| 2018 | 60 | 124 | 2.07 | 0 | 0 | 0 | 8 | 45 |
| 2019 | 80 | 117 | 1.46 | 0 | 0 | 1 | 5 | 52 |
| 2020 | 80 | 68 | 0.85 | 0 | 0 | 0 | 2 | 34 |
| 2021 | 80 | 18 | 0.23 | 0 | 0 | 0 | 0 | 12 |
| 2022 | 17 | 0 | 0.00 | 0 | 0 | 0 | 0 | 0 |
| Total | 1270 | 5361 | 66.88 | 4 | 18 | 146 | 393 | 979 |
| Percentage | %100 | | | 0.31 | 1.42 | 11.50 | 30.94 | 77.09 |

Abbreviations: TP=Total papers; TC= Total citations; CPP= Citations per paper; ≥50, ≥25, ≥0, ≥5, ≥1=Number of papers with equal or more than 50, 25, 10, 5 and 1 citations.

From 2007, when ESJ began to be indexed in WoS, until 2022, a total of 5361 citations were made to the 1270 publications published in the journal. This corresponds to approximately 4.22 citations per publication. Additionally, more than fifty citations were made to 0.3 % of the publications, more than ten citations to approximately 12 % of the publications, and more than five citations to over 31 % of the publications.

### *Who are the prominent authors and institutions of ESJ?*

This research question investigates the most prolific authors and institutions in ESJ. To this end, the study examines the most productive authors and the most productive and influential institutions within ESJ.

#### *The most productive authors of ESJ*

Table 2 presents the top 20 most prolific authors of ESJ together with their current affiliations. To identify the most productive authors in ESJ, several metrics were used: the number of publications, the number of citations, total link strength (calculated using VOSviewer software), citations per publication, years of publication, average number of citations per year, h-index, and various citation thresholds. The ranking in Table 2 is primarily based on the number of publications, but the number of citations is taken into consideration in case of a tie.

Table 2. The most productive authors in ESJ

| R | Author Name | University | TP | TC | CPP* | PY* | CPY* | H* | ≥20 | ≥10 | ≥5 | ≥2 | ≥1 | TLS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Ozdemir, M. | Hacettepe University | 9 | 39 | 4.33 | 2012-2021 | 3.90 | 4 | 0 | 1 | 4 | 7 | 8 | 12 |
| 2 | Geban, O. | Middle East Technical University | 7 | 53 | 7.57 | 2010-2016 | 4.42 | 3 | 0 | 3 | 3 | 6 | 7 | 12 |
| 3 | Goktas, Y. | Ataturk University | 6 | 65 | 10.83 | 2007-2015 | 4.33 | 5 | 1 | 3 | 5 | 6 | 6 | 12 |
| 4 | Ogretmen, T. | Ege | 6 | 35 | 5.833 | 2008- | 2.50 | 4 | 0 | 1 | 4 | 5 | 5 | 9 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | University | | | | 2012 | | | | | | | | |
| 5 | Dogan, N. | Hacettepe University | 6 | 31 | 5.17 | 2008-2012 | 2.21 | 3 | 0 | 1 | 3 | 4 | 6 | 7 |
| 6 | Baki, A. | Trabzon University | 6 | 22 | 3.67 | 2011-2022 | 2.00 | 2 | 0 | 1 | 2 | 4 | 4 | 8 |
| 7 | Akyol, H. | Gazi University | 6 | 21 | 3.50 | 2014-2022 | 2.63 | 3 | 0 | 1 | 2 | 4 | 4 | 5 |
| 8 | Kutlu, O | Ankara University | 6 | 10 | 1.67 | 2012-2020 | 1.00 | 2 | 0 | 0 | 0 | 3 | 5 | 7 |
| 9 | Deniz, M.E. | Yildiz Technical University | 5 | 84 | 16.80 | 2010-2019 | 7.00 | 4 | 1 | 2 | 4 | 5 | 5 | 9 |
| 10 | Gelbal, S. | Hacettepe University | 5 | 65 | 13.00 | 2008-2022 | 4.64 | 3 | 2 | 3 | 3 | 4 | 4 | 4 |
| 11 | Senemoglu, N. | Hacettepe University | 5 | 48 | 9.60 | 2009-2011 | 3.69 | 4 | 0 | 2 | 3 | 4 | 4 | 4 |
| 12 | Akin, A. | Mehmet Akif Ersoy University | 5 | 47 | 9.40 | 2009-2015 | 3.62 | 4 | 1 | 2 | 4 | 4 | 4 | 3 |
| 13 | Horzum, M.B. | Sakarya University | 5 | 46 | 9.20 | 2011-2017 | 4.18 | 4 | 1 | 2 | 4 | 4 | 4 | 12 |
| 14 | Yurdugul, H. | Hacettepe University | 5 | 43 | 8.60 | 2009-2014 | 3.31 | 3 | 1 | 1 | 2 | 4 | 4 | 9 |
| 15 | Duyan, V. | Ankara University | 5 | 37 | 7.40 | 2008-2013 | 2.64 | 3 | 1 | 1 | 2 | 5 | 5 | 11 |
| 16 | Sen, A.I. | Hacettepe University | 5 | 34 | 6.80 | 2009-2014 | 2.62 | 3 | 0 | 2 | 3 | 5 | 5 | 3 |
| 17 | Altinkurt, Y. | Mugla Sitki Kocman University | 5 | 25 | 5.00 | 2012-2021 | 2.50 | 3 | 0 | 1 | 3 | 4 | 4 | 11 |
| 18 | Bayat, N. | Akdeniz University | 5 | 18 | 3.60 | 2014-2020 | 2.25 | 2 | 0 | 0 | 2 | 3 | 5 | 6 |
| 19 | Sungur, S. | Middle East Technical University | 5 | 15 | 3.00 | 2011-2018 | 1.36 | 2 | 0 | 0 | 0 | 1 | 2 | 7 |
| 20 | Aral, N. | Ankara University | 5 | 9 | 1.80 | 2014-2017 | 1.13 | 1 | 0 | 0 | 1 | 1 | 5 | 6 |

R = Rank; TP=Total papers; TC=Total citations; CPP=Citations per paper; PY=Publication years; CPY= Average number of citations per year (citations/citation years); H= h-index; ≥20, ≥10, ≥5, ≥2, ≥1=Number of papers with an annual citation count equal or more than 20, 10, 5, 2 and 1 citations; TLS=Total link strength.
*Calculated using Harzing's Publish and Perish software (Harzing, 2007) by searching the author and journal keywords determined in the study.

When Table 2 is examined, it is observed that many authors from various universities in Türkiye have published in ESJ. However, the majority of these authors are affiliated with universities in Ankara, Türkiye's capital, specifically Hacettepe University (f=6), Ankara University (f=3), and Middle East Technical University (f=2). The most prolific author in ESJ is Murat Özdemir, with 9 publications. His h-index is 4, indicating that 4 of his publications have been cited at least 4 times each. Mehmet Engin Deniz, ranked 9th on the list, stands out with the highest citations per publication at 16.80 and the highest average annual citations at 7.00.

*The most productive and influential institutions of ESJ*

Table 3 lists the top 20 most productive institutions in ESJ. The ranking in Table 3 is primarily based on the number of publications, with the number of citations used as a tiebreaker in case of a tie. These institutions represent the affiliations of the authors at the

time they published in ESJ. Therefore, there may be publications for authors who have changed their affiliated institutions over time. To identify the most productive institutions in ESJ, metrics such as the number of publications, number of citations, h-index, citations per publication, and the number of papers reaching citation thresholds of 50, 25, 5, and 1 citation were used. Additionally, the current global and Türkiye rankings of these institutions according to the Academic Ranking of World Universities (ARWU) and University Ranking by Academic Performance (URAP) are presented in Table 3. The aim here is to see the comparative rankings of these leading universities in ESJ with their global and Türkiye rankings in terms of these two indicators.

Table 3. The most productive and influential institutions in ESJ

| R | Institution | TP | TC | H | CPP | ≥50 | ≥25 | ≥5 | ≥1 | URAP | ARWU |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Hacettepe University | 181 | 947 | 15 | 5.23 | 1 | 3 | 71 | 153 | 1 | 701-800 |
| 2 | Gazi University | 139 | 529 | 10 | 3.81 | 0 | 2 | 38 | 108 | 7 | 901-1000 |
| 3 | Ankara University | 120 | 461 | 10 | 3.84 | 0 | 1 | 37 | 95 | 6 | 801-900 |
| 4 | Ministry of National Education Türkiye | 79 | 194 | 6 | 2.46 | 0 | 1 | 15 | 50 | - | - |
| 5 | Middle East Technical University | 61 | 347 | 10 | 5.69 | 0 | 2 | 23 | 49 | 2 | 901-1000 |
| 6 | Anadolu University | 53 | 252 | 10 | 4.75 | 0 | 1 | 22 | 39 | 32 | - |
| 7 | Marmara University | 41 | 90 | 5 | 2.20 | 0 | 0 | 6 | 26 | 15 | - |
| 8 | Karadeniz Technical University | 36 | 221 | 10 | 6.14 | 0 | 1 | 22 | 39 | 21 | - |
| 9 | Sakarya University | 35 | 199 | 9 | 5.69 | 0 | 0 | 16 | 30 | 33 | - |
| 10 | Abant Izzet Baysal University | 32 | 97 | 5 | 3.03 | 0 | 0 | 7 | 23 | 51 | - |
| 11 | Necmettin Erbakan University | 30 | 95 | 6 | 3.17 | 0 | 0 | 7 | 23 | 48 | - |
| 12 | Atatürk University | 29 | 234 | 8 | 8.07 | 1 | 1 | 13 | 27 | 16 | - |
| 13 | Ege University | 28 | 160 | 7 | 5.71 | 0 | 1 | 14 | 24 | 8 | 901-1000 |
| 14 | Pamukkale University | 28 | 116 | 6 | 4.14 | 0 | 1 | 8 | 20 | 41 | - |
| 15 | Dokuz Eylül University | 24 | 92 | 6 | 3.83 | 0 | 0 | 7 | 23 | 17 | 701-800 |
| 16 | Yıldız Technical University | 23 | 120 | 8 | 5.22 | 0 | 0 | 11 | 19 | 12 | - |
| 17 | Gaziosmanpasa University | 23 | 67 | 5 | 2.91 | 0 | 0 | 6 | 16 | 62 | - |
| 18 | Mugla Sıtkı Kocman University | 22 | 122 | 7 | 5.55 | 0 | 0 | 10 | 17 | 53 | - |
| 19 | Akdeniz University | 21 | 68 | 5 | 3.24 | 0 | 0 | 8 | 16 | 25 | - |
| 20 | Selcuk University | 20 | 127 | 6 | 6.35 | 0 | 1 | 7 | 17 | 19 | - |

R = Rank; TP=Total papers; TC=Total citations; H=h-index; CPP=Citations per paper; ≥50, ≥25, ≥5, ≥1=Number of papers with equal or more than 50, 25, 5 and 1 citations; ARWU= Academic Ranking of World Universities; URAP= University Ranking by Academic Performance.

Considering productivity in ESJ, it is observed that Hacettepe University is the most productive institution in the journal with 181 publications (Table 3). Hacettepe University has an h-index of 15, indicating that 15 of its publications have received at least 15 citations each. Gazi University ranks second with 139 publications, while Ankara University ranks third with 120 publications. All three universities in the top three positions are located in Ankara, the capital city of Türkiye. Despite being ranked 12th with 29 publications, Atatürk University in Erzurum stands out with an average of approximately 8 citations per publication. When the relative positions of the universities are taken into consideration, six of these universities are within the top 1000 globally according to the Academic Ranking of World Universities (ARWU) for the year 2022. However, according to the University Ranking by Academic Performance (URAP) for the year 2022, only five of these universities are in the top 10 in

Türkiye.

The subsequent research questions in the study aim to conduct a more in-depth analysis of the publication structure of ESJ through visualization of the publications in ESJ by performing a graphic mapping. For this purpose, co-authorship and co-occurrence analyses were conducted using the VOSviewer software (Van Eck & Waltman, 2010) on the metadata set obtained from the WoS database. These analyses will provide insights into the collaborative networks among authors, the thematic links between publications, and the relationships between different research topics within ESJ.

***How is the co-authorship of the authors publishing in ESJ?***

With this research question, the co-authorship of the authors publishing in ESJ was investigated.

The co-authorship map of ESJ is shown in Figure 3. While the co-authorship map encompasses 1,928 authors identified in the publications in our review database, the map in Figure 7 represents the most productive authors with more than 3 articles in ESJ and the top 134 strongest co-authorship links among these authors. The size of the circles in the co-authorship map represents the number of publications by authors, while the proximity of the circles indicates collaboration among the authors (Goksu, 2021).

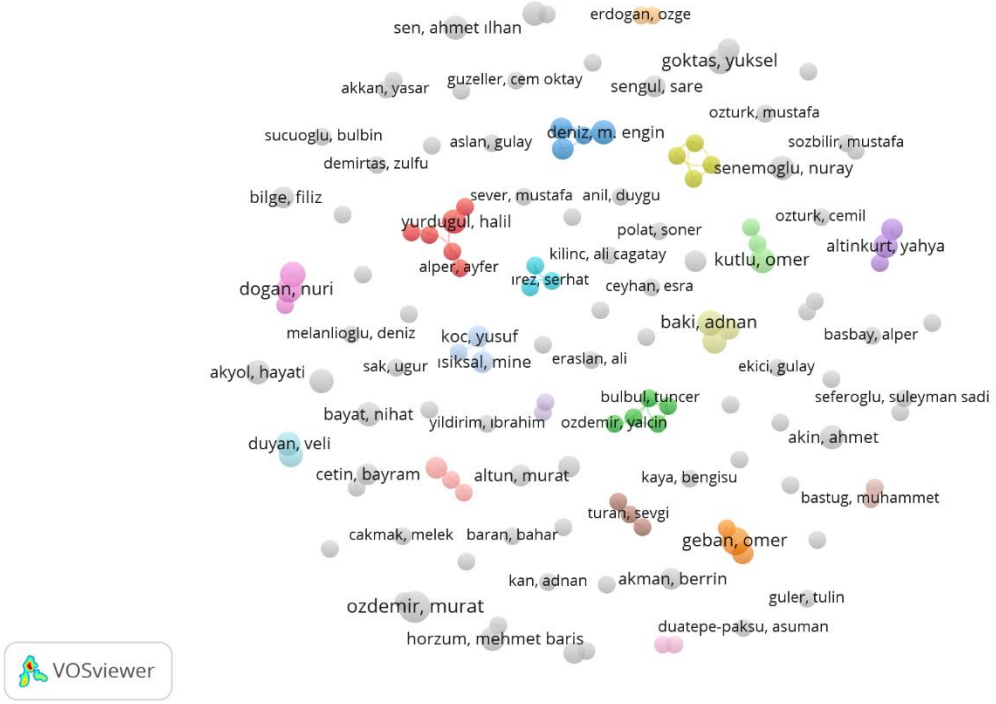


Figure 3. Co-authorship of authors that publish in ESJ (Out of 1,928 authors who published, 134 authors who met the threshold of 3 publications are shown.)

It has been determined, as a result of the analysis of co-authorship among authors publishing in ESJ, that the authors form 86 distinct co-authorship clusters, and none of these clusters are linked to each other. This suggests that collaboration among authors in co-authorship clusters formed in ESJ is weak. When the visualization map of the authors' co-authorship network in Figure 7 is examined, it is observed that the red cluster has the highest number of authors,

with 6 authors, and the most productive author in this cluster is H. Yurdugül with 5 articles. The second-largest cluster is the green cluster, with 5 authors, and all the authors in the green cluster have published 3 articles in the journal. The blue and yellow clusters share the third place with 4 authors each. The most productive author in the blue cluster is M. E. Deniz with 5 articles, while all the authors in the yellow cluster have 3 articles each. In addition, it is observed that 58 authors do not have any co-authorship among the 134 authors in the 86 clusters identified in the co-authorship map.

***How is the co-occurrence of author keywords in ESJ publications?***

This research question is aimed at investigating the co-occurrence of author keywords in ESJ publications. To achieve this, a co-occurrence analysis of author keywords, also known as co-word analysis, was conducted in two stages using VOSviewer to identify the topics and themes examined in the publications in ESJ.

In the first stage, a co-occurrence analysis of author keywords in all publications published in ESJ so far was conducted. In the second stage, a temporal co-occurrence analysis of author keywords was performed to reveal the 'research front' (Price, 1965) of ESJ, or the research areas that authors contributing to this journal have recently been interested in. VOSviewer examines the temporal distribution (i.e., publication years) of each keyword in the publications. For example, in the first stage, the co-occurrence analysis of author keywords in VOSviewer reveals that the keyword 'academic achievement' appears 34 times in ESJ publications. In the second stage, the temporal co-occurrence analysis of author keywords involves a more detailed examination of the publication dates of the 34 documents containing the keyword 'academic achievement'. This process allows for the creation of a temporal distribution for each keyword, indicating the frequency of use, co-occurrence relationship, and the time period when different keywords are most popular. As a result, a temporal co-occurrence map of author keywords is obtained, indicating the temporal dynamics of keyword usage and co-occurrence patterns (Hallinger, Gümüş, & Bellibaş, 2020).

The co-occurrence map of the author keywords for articles published in ESJ from its inception to the present is shown in Figure 4. Although the co-occurrence map of author keywords comprises 3,275 keywords determined by the authors in the journal's publications, Figure 4 displays the most popular keywords and their strongest 40 co-occurrence links among keywords that have appeared in more than 10 publications in ESJ. The size of the circles in the co-occurrence network map represents the number of publications where keywords co-occur.

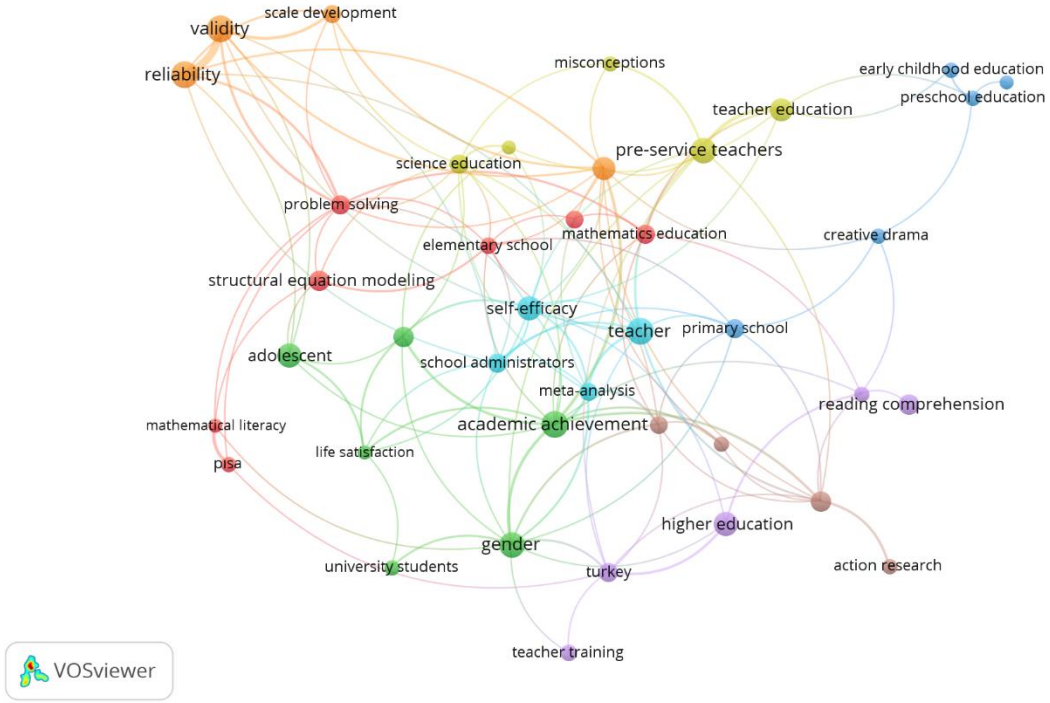


Figure 4. Co-occurrence of author keywords of articles published in ESJ (Out of a total of 3,275 keywords, 40 keywords that meet the threshold of 10 co-occurrences are shown.)

When the co-occurrence of author keywords in ESJ publications is examined, it is observed that the keywords form 8 distinct co-occurrence clusters, and all keywords meeting the threshold of 10 co-occurrences are interlinked. The keywords in these clusters provide insights into the topics investigated in ESJ publications. As observed in Figure 4, the largest cluster consists of 7 keywords, forming the red cluster. The prominent keywords in the red cluster are structural equation modeling (f=20) and problem solving (f=17). Following the red cluster, the green cluster consists of 6 keywords. The prominent keywords in the green cluster are academic achievement (f=34) and gender (f=29). The keyword academic achievement in this cluster has become the most frequently used keyword in the journal, along with the keyword reliability (f=34) in the orange cluster. The green cluster is followed by the blue, yellow, and purple clusters, each consisting of 5 keywords. The prominent keywords in the blue cluster are elementary school (f=18) and preschool education (f=12). The prominent keywords in the yellow cluster are pre-service teachers (f=29) and teacher education (f=24), while those in the purple cluster are higher education (f=26) and reading comprehension (f=19). Lastly, the turquoise, orange, and brown clusters, each consisting of 4 keywords, rank 6th, 7th, and 8th, respectively. The prominent keywords in the turquoise cluster are teacher (f=33) and self-efficacy (f=26). The prominent keywords in the orange cluster are reliability (f=34) and validity (f=33), while those in the brown cluster are social sciences (f=20) and academic achievement (f=14). Additionally, it is observed that the keyword validity in the orange cluster has the highest TLS value among the keywords. These findings highlight the importance of reliability, academic achievement, validity, teacher, and gender in ESJ.

The visualization map of temporal co-occurrence of author keywords is provided in Figure 5, allowing insights into the trend of publications over the years in ESJ and the most preferred research topics by the researchers contributing to the journal.

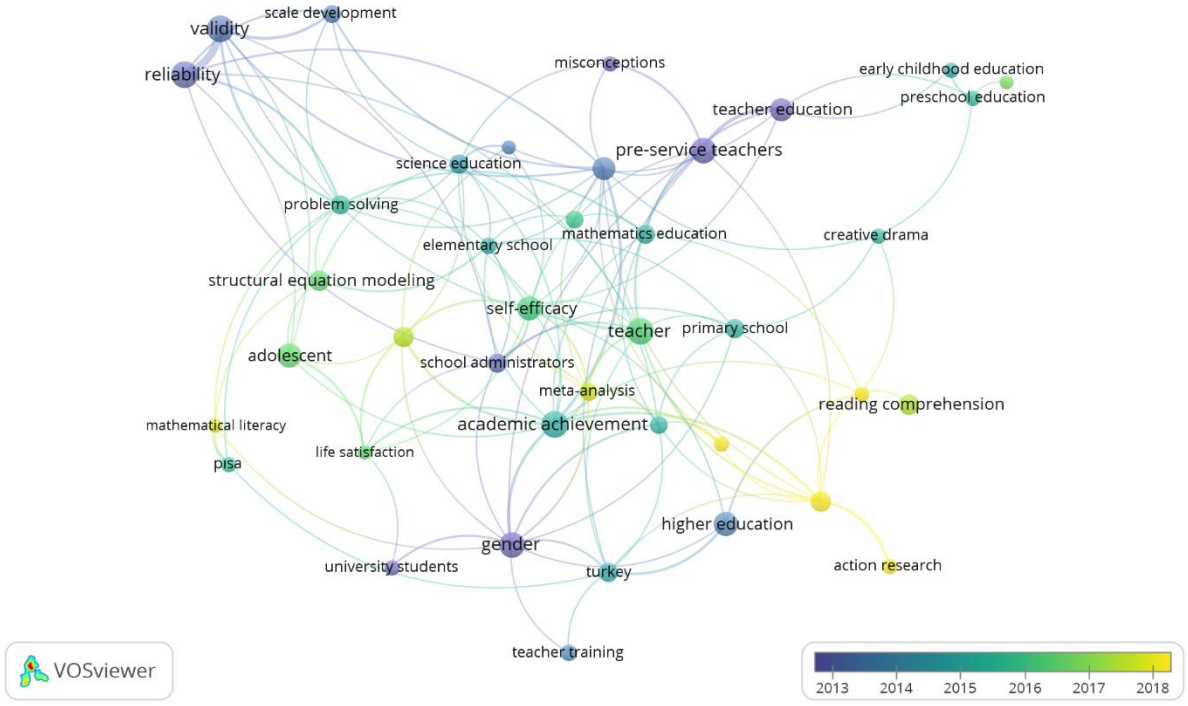


Figure 5. Temporal co-occurrence of author keywords of articles published in ESJ (Out of a total of 3,275 keywords, 40 keywords that meet the threshold of 10 co-occurrences are shown.)

When Figure 5 is examined, it can be seen that in recent years, the keywords of action research, mixed methods, middle school students, social sciences, mathematical literacy, and meta-analysis have come to the fore in ESJ. These findings indicate that researchers contributing to ESJ have been focusing on research related to these topics and methods in recent years.

## Discussion and Conclusion

ESJ, i.e., Education Sciences Journal, is one of the most prestigious and longstanding journals in the field of educational sciences in Türkiye, publishing since 1976. Therefore, this article aims to create a bibliometric map of ESJ, providing researchers with insights and understanding specific to the journal about the current state and development of educational sciences in Türkiye. The study examines all the publications from January 1, 2007, when the journal began to be indexed by WoS, until May 1, 2022, utilizing metadata from WoS. In this way, this study aims to provide a general overview of the leading trends in the journal. To achieve this goal, multiple criteria have been used in this study, such as the annual number of publications and citation structure to create 'scientific impact,' most prolific authors and institutions in the journal, co-authorships, and co-occurrences of author keywords.

When the 1270 publications of ESJ, starting from the year 2007, at which time it began to be indexed in WoS, are examined in terms of publication count and citation structure, it is observed that the journal has displayed significant progress over time. An increase is observed in the number of publications between 2007 and 2014, followed by fluctuating trends in subsequent years. Notably, a significant decrease in the number of studies can be observed in

recent years, particularly in 2022. This decline may be attributed to several factors, including the potential impact of global events such as the COVID-19 pandemic, changes in the journal's editorial policies leading to increased selectivity, or shifting preferences among researchers towards other journals (Parlar & Kart, 2022). For instance, Chen et al. (2020) noted similar fluctuations in publication trends for Computers & Education, influenced by global and institutional factors. Out of these publications, 1264 of them consist of articles, while 6 are reviews. Furthermore, it is noted that 36 of these articles were presented as conference papers.

Kutluca and Demirkol (2016) determined, in their bibliometric analysis of the Dicle University Journal of Ziya Gokalp Education Faculty, that the studies in the journal were predominantly published as articles and demonstrated an increasing trend over the years. Similarly, Karagöz and Şeref (2019) identified that publications in the Journal of Values Education increased between 2009 and 2015, despite a dip in 2016. Another study by Karagöz and Koç Ardıç (2019) showed that articles published in the Journal of Mother Tongue Education between 2013 and 2018 displayed continuous development despite fluctuations. Chen et al. (2020) conducted a bibliometric analysis of 3963 articles published in the journal Computers & Education from 1976 to 2018, examining the topics and trends of the journal's publications. The study revealed that while the annual average number of articles published was around 60 before 2006, this number increased approximately fourfold to an average of 240 articles between 2006 and 2008 and then continued to fluctuate until 2015. These findings reinforce the notion that educational journals exhibit both growth and variability, influenced by their context and audience. In this study, which examined the publications between 2009 and 2018, it was found that the studies were predominantly published as articles and showed an increasing trend from 2009 to 2015, despite a decrease in 2016, which was followed by a continuation of the upward trend in subsequent years.

When the citation structure of ESJ is examined, it is observed that the total number of publications, which stands at 1270, has been cited 5361 times. The total citation count shows a fluctuating trend over the years, initially increasing and then decreasing. When the total citations are divided by the number of publications, an average of 4.22 citations per publication is calculated. However, it is observed that more than fifty citations are made to only 0.3 % of the publications, while over ten citations are made to approximately 12 %, and more than five citations are made to over 31 % of the publications. In 2014, ESJ had the highest number of publications with 168, and the highest annual total citation count was also in 2014 with 841 citations. This peak in publications and citations may be linked to the types of studies published during this period, which could have been influenced by emerging trends or significant academic events in educational sciences. A closer examination of the 2014 publications reveals a strong focus on topics such as academic success, teacher training, and methodological advancements, which were not only timely but also aligned with broader global trends in education research. For example, Chen et al. (2020) noted that journals with topical relevance during specific periods often experience a surge in both publications and citations. This highlights how ESJ has reflected and contributed to the evolving discourse in educational sciences, particularly during its peak publication year. When the relevant literature was examined, Karagöz and Şeref (2019) found in their bibliometric analysis of the Journal of Values Education that 167 articles published over 10 years had been cited a total of 576 times, resulting in an average of approximately 3.45 citations per article. In conclusion, based on these findings, it can be said that ESJ contributes to scholarly interaction in the literature and serves as a guiding resource in various studies.

When productivity in ESJ is considered, it is observed that the most prolific author is Murat Özdemir with 9 publications. When productivity is considered at the university level, on the other hand, Hacettepe University stands out as the most prolific university with 181 publications, followed by Gazi University with 139 publications, and Ankara University with 120 publications. Similar findings were reached in a study by Selçuk et al. (2014), which aimed to determine the trends of research published in ESJ. In this study, the analysis of 509 studies published in ESJ between 2007 and 2013 revealed that Hacettepe University was the most prolific university with 80 articles, followed by Ankara University with 46 articles, and Gazi University with 42 articles. Another study by Doğan and Tok (2018), which examined articles published in the field of education sciences in Türkiye using ESJ as an example, also supported our findings. In their study, in which they examined 311 articles, it was concluded that Hacettepe University was the most prolific university with 25 articles, followed by Ankara University with 22 articles, and Gazi University with 18 articles. In a study by Karagöz and Koç Ardıç (2019), where they analyzed articles in the Journal of Mother Tongue Education using bibliometric analysis, it was noteworthy that Gazi University ranked first at the university level, while Hacettepe University ranked 20th on the list. When the relative positions of universities in our country/region are considered, six universities are among the top 1000 globally according to the ARWU Academic Ranking of World Universities 2022. On the other hand, only five universities are in the top 10 according to URAP's Academic Ranking of Turkish Universities 2022. When the most prolific institutions in ESJ are examined, Hacettepe University, Gazi University, and Ankara University, which rank in the top three, are among the top 10 in URAP, and among the top 1000 in ARWU. An examination of the research published in this regard reveals that the journal has a widespread academic spectrum throughout the country/region considering that alongside historically prominent universities such as Hacettepe, Gazi, and Ankara, the Turkish Ministry of National Education has a notable influence and that recently established universities also find a place in the productivity list of the aforementioned studies.

As a result of the co-authorship analysis of the authors conducted in order to determine the collaboration of the authors publishing in ESJ, it was determined that the authors created 86 different co-authorship clusters, and none of these clusters were linked to each other. This observation is consistent with the findings of Chen et al. (2020), who identified limited collaboration among authors in regional journals. The lack of interconnected clusters in ESJ may be due to its regional focus and the dynamics of educational sciences, where small-scale collaborations are more prevalent than large multi-institutional projects. For example, Akturk (2022) noted similar dynamics in the Journal of Computer Assisted Learning, where collaboration strength was influenced by journal scope.

A co-occurrence analysis of author keywords, also known as co-word analysis in VOSviewer, was carried out in two stages to determine the topics and themes examined in the publications made in ESJ. In the first stage, it was found that academic success, reliability, teacher, gender, preservice teachers, higher education, self-efficacy, and structural equality modeling were the most important keywords. These findings resonate with those of Gülmez, Özteke, and Gümüş (2020), who identified similar thematic priorities in educational research originating from Türkiye. Furthermore, the second stage of the co-occurrence analysis revealed that action research, mixed methods, and meta-analysis have gained prominence in recent years. This trend aligns with observations in the literature, which indicate a growing emphasis on methodological diversity and systematic reviews in educational sciences (e.g., Başar, Göncü, & Baran, 2021; Mutluer & Çelikoç, 2022).

When the literature is examined, it can be said that in recent years there has been an increase in the number of studies in the field of educational sciences, especially action research (Başar, Göncü, & Baran, 2021; Karatay & Taş, 2021; Yeler & Ocak, 2021), mixed method (Mutluer & Çelikoç, 2022; Toraman, 2021), and meta-analysis (Aksoy Kürü, 2021; Gür & Bulut Özek, 2021; Sarıer, 2022). This thematic shift underscores the evolving priorities in educational research, emphasizing the need for methodological rigor and comprehensive analyses to address complex educational challenges.

## Limitations and Contributions

In this study, bibliometric data of the ESJ covering the years 2007-2022 were obtained using the WoS database and examined bibliometrically. While the reliability of other databases such as Eric and Scopus is acknowledged, it is thought that the findings obtained from the WoS database will be sufficient for reasons such as that WoS is considered the most respected indexed database for scientific publications both in Türkiye and internationally, it has a broad coverage of the field of education and contains more volumes than other databases (for example, Scopus contains only volumes after 2008). However, the results may be slightly different when another database or even combinations of databases are used to retrieve the data. Although the WoS database is considered one of the most effective databases for classifying scientific research, it has some limitations.

Firstly, WoS uses a full counting method when dealing with bibliographic material. That is, this database provides a unit of publication for any co-authoring contributor rather than a fractional unit based on the number of co-authors. Therefore, papers with many co-authors tend to have more importance in the analysis than single-author papers. Secondly, publications covering popular research topics tend to be more cited than those covering other topics. However, this does not mean that the publication with more citations is of higher quality. Still, receiving more citations is considered a good indicator of impact value. Thirdly, since author analyses measure publications by taking into account the authors who publish in the journal and their affiliation (institution and country/region) at the time of publication, the results represent data at the time of publication. However, many authors may have changed institutions over time. Finally, the results of this article represent the overall picture available in ESJ until 2022. Due to the dynamic nature of bibliometric data, these results are likely to change in the future. Additionally, this bibliometric review is based solely on articles published in ESJ. Since other types of documents, such as editorial materials or letters, generally do not contain original research results and are therefore rarely cited (Glänzel & Moed, 2002), documents of this type published in ESJ have not been included in the bibliometric analysis.

Despite these limitations, this study provides a comprehensive overview of the trends, collaborations, and thematic evolution of ESJ over a 15-year period. The bibliometric mapping of ESJ not only highlights its pivotal role in advancing educational sciences in Türkiye but also offers a valuable resource for researchers to understand the journal's influence and potential directions for future studies. For example, findings reveal that key areas such as academic success, teacher education, and self-efficacy resonate strongly with broader trends observed in educational research globally (Chen et al., 2020; Akturk, 2022). Furthermore, the identification of emerging methodologies like mixed methods and meta-analysis aligns with recent shifts in research approaches, as seen in studies focusing on evolving pedagogical practices (Başar et al., 2021; Mutluer & Çeliköz, 2022). By situating ESJ within this broader context, the study underscores its importance as a bridge between

localized research priorities in Türkiye and global educational discourses, contributing to both theoretical advancement and practical applications in the field.

## Suggestions

This study provides insights and understanding specific to the journal regarding the development and status of educational sciences in Türkiye by examining ESJ's publications and research topics with a methodologically innovative bibliometric analysis method. Therefore, some suggestions can be made for future studies. Firstly, since the current findings of the research are based solely on a single journal, conducting further research with comparable journals can provide a more in-depth exploration of educational sciences in Türkiye. Secondly, it is recommended that Türkiye-based journals listed in international indexes or aiming to be listed in them pay particular attention to internationalization. They can achieve this by diversifying their editorial and publication boards and striving to include publications from different countries. Thirdly, due to the relatively broad scope of research discussed in educational sciences, further investigation of the scientific collaboration of authors who conduct research on fields of learning such as science, mathematics, engineering, health, social, arts and history; topics such as lifelong learning, game-based learning, technology-assisted learning, blended learning, flipped learning, measurement and evaluation, learning analytics; and levels of educational such as early childhood, primary school, secondary school and higher education may provide more diverse perspectives.

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