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| Research Article / Araştırma Makalesi |

A Bibliometric Research from Past to Present on the Development of Individual Educational Plan (IEP) Studies in Early Childhood Education

Erken Çocukluk Eğitiminde Bireyselleştirilmiş Eğitim Planı (BEP) Araştırmalarının Geçmişten Günümüze Gelişimi Üzerine Bibliyometrik Bir Araştırma

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Keywords

1. Early childhood education
2.Individualized education programs
3.IEP
4.Bibliometric analysis

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Abstract

Purpose: This study aims to examine scientific studies published in the Scopus database on Individualized Education Program (IEP) applications in early childhood education through bibliometric methods. In addition, it aims to provide researchers with in-depth information on the matter, as well as to shed light on publications to be made about it.

Design/Methodology/Approach: This study is a descriptive qualitative study based on a systematic analysis of the articles. The research population is made up of 108 studies in English published about this subject in journals scanned in the Scopus database between 1977 and 2019. In the analysis processes, an open-source code R statistics program was preferred. With the bibliometric analysis, both the research field's descriptive findings and social and intellectual findings were included.

Findings: According to the results obtained from the research, there has been an increase in the studies carried out in this field in the last 10 years. It has been stated that American-based studies come to the fore in collaborative tasks. It was observed that the first three articles with the most citations were studies mainly in the field of health and were included in journals published in the field of medicine. When the journals that publish the highest number of publications on IEP in early childhood are examined, it is seen that the journals "Exceptional Children," "Journal of Early Intervention," and "Topics in Early Childhood Special Education" have the most publications on the subject.

Highlights: In this study, the literature on IEP applications, which are critical for children with special needs in early childhood practices, was reviewed, and the characteristics of the studies were revealed. In this context, this research is essential in providing descriptive, social and intellectual information about the subject to those who want to do new research on this subject. As studies on this subject increase, the quality of the practices related to meeting the needs of children with special needs and families in the early childhood stage will also increase.

Öz

Çalışmanın amacı: Bu çalışmanın amacı, erken çocukluk eğitiminde Bireyselleştirilmiş Eğitim Programı (BEP) uygulamaları konusunda Scopus very tabanında yayınlanmış bilimsel çalışmaları bibliyometrik yöntemlerle incelemektir. Ek olarak, araştırmacılara konu hakkında derinlemesine bilgi sağlamayı amaçlamaktadır; bunun yanı sıra bu konuda yapılacak yayınlara da ışık tutmaktadır.

Materyal ve Yöntem: Bu çalışma nitel sistematik analiz desenli betimsel bir çalışmadır. Araştırmanın evreni, 1977-2019 yılları arasında Scopus veri tabanında taranan dergilerde bu konu ile ilgili olarak yayınlanan 108 adet İngilizce çalışmadan oluşmaktadır. Analiz süreçlerinde açık kaynak kodlu R istatistik programı tercih edilmiştir. Yapılan bibliyometrik analizle hem betimsel bulgulara hem de araştırma alanına ait sosyal ve entelektüel bulgulara yer verilmiştir.

Bulgular: Araştırmadan elde edilen bulgulara göre, son 10 yılda bu alanda yapılan çalışmalarda artış olmuştur. Amerikan merkezli çalışmalar işbirlikçi çalışmalarda ön plana çıkmaktadır. En çok atıf alan ilk üç makalenin daha çok sağlık alanında olduğu ve tıp alanında yayınlanan dergilerde yer aldığı görüldü. Erken çocukluk döneminde BEP ile ilgili en çok yayın yapan dergiler incelendiğinde, "Exceptional Children", "Journal of Early Intervention" ve "Topics in Early Childhood Special Education" dergilerinin en çok yayına sahip olduğu görülmektedir.

Önemli Vurgular: Bu çalışmada, erken çocukluk uygulamalarında özel gereksinimli çocuklar için kritik önem taşıyan BEP uygulamaları ile ilgili literatür gözden geçirilmiş ve çalışmaların özellikleri ortaya çıkarılmıştır. Bu bağlamda bu araştırma, bu konuda yeni araştırmalar yapmak isteyenlere konu hakkında betimleyici, sosyal ve düşünsel bilgiler sağlaması açısından önemlidir. Bu konudaki çalışmalar arttıkça erken çocukluk döneminde özel gereksinimli çocukların ve ailelerin ihtiyaçlarının karşılanmasına yönelik uygulamaların kalitesinin de artacağı düşünülmektedir.

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INTRODUCTION

There are individuals with typical development in societies regarding their individual and developmental characteristics and individuals with special needs who have different developmental features than their peers (Ozsoy, Ozyurek & Eripek 1998). (Sucuoglu, 1993) These individuals, who show developmental differences from their peers for different reasons, have difficulties acquiring skills appropriate for their age. Considering these difficulties experienced by individuals with special needs, the importance of meeting their educational needs by taking into account their individual differences emerges. Based on taking individual differences into consideration in the education process, which is the most essential condition of the right to education, the requirement of preparing BEP in the education of individuals with special needs has been born (Diken & Batu, 2010; Martin, Van Dycke, Christensen-Greene, Gardner & Lovett, 2006). Fiscus and Mandell (2002) also emphasized the importance of preparing BEP to meet their individual needs in children's education with special needs.

The education and opportunities offered in early childhood, which covers the 0-8 age period, when development and learning are the fastest, profoundly affect the child's development and learning speed. In this context, early intervention practices that take individual differences into account are critical in minimizing or eliminating the developmental difference between children with special needs and their peers in early childhood. The purpose of special education services provided in early childhood is to support and accelerate children who differ from their peers or are at risk and reduce the difference between them and their peers (Sucuoglu, 2001). Individuals with special needs with specific developmental differences from their peers also have the right to receive education under equal conditions with their peers based on equal opportunity in education. The setting in which the education of individuals with special needs should be carried out has changed in the historical process. In the past, the teaching of individuals with special needs was carried out in special education schools separate from their typically developing peers, but nowadays, mainstreaming education has been adopted, where they receive education under equal conditions with their peers (Kargın, 2004). Inclusive education enables these individuals to participate in educational environments and social life and ensures that individuals with normal development benefit equally from the opportunities they help from (Batu & Kırcaaali-İftar, 2011).

Considering the necessity of planning education programs in line with the individual characteristics, interests and needs of children with special needs (Çuhadar, 2006; Tuysuz, 2013), it becomes necessary to prepare an individualized education program (IEP) for children who are included in inclusive education in early childhood. Vuran (2004) stated that the primary purpose of the BEP prepared for children with special needs is to provide these children with educational opportunities to benefit at the highest level. In pre-school education institutions where early intervention programs are implemented, an individualized education program (IEP) needs to be prepared for children enrolled in inclusive education. IEP, which is ready for students with special needs and used in their education (Kamens, 2004), is a written document prepared by a team including the family, teacher, relevant experts, and, if appropriate, the child himself, according to their individual differences and needs, foreseeing that children with special needs benefit from the proper educational environments and support services at the highest level (Martin, Van Dycke, Greene, Gardner, Lovett, 2006; Vuran, 2004). Smith, Slattery and Knopp (1993) stated that IEP is a vital tool for providing a suitable learning environment for students with special needs and supporting their development at the highest level.

The necessity of preparing IEP for children who receive inclusive education was brought to the agenda for the first time with the PL.94-142 education law for all disabled children enacted in the USA in 1975 (Keogh, 2007). IEP applications ensure equality of opportunity in education, determining the child's educational needs with special needs and supporting the development of the child by making the necessary adjustments. According to the systematic instruction provided in line with the individual characteristics and requirements of the child with special needs, the learning speed and development course of the child will be supported at the maximum level. IEP is a program formed by the IEP team in the school where the child is educated, and it determines the current performance of the child, long and short-term goals, the type and duration of the exceptional education service to be offered to the child, and the extent to which the child will participate in it (Fiscus & Mandell, 2002; Martin et al., 2006). Studies on IEP applications reveal that IEP applications support children's development and benefit parents and teachers (Boavida, Aguiar, & McWilliam, 2014; Diamond & Carpenter, 2000; Grisham-Brown, & Hemmeter, 1998; Horn, Lieber, Li, Sandall, & Schwartz, 2000, O'connor, & Yasik, 2007; Ozturk & Eratay, 2010; Pretti-Frontczak & Bricker, 2000; Ruble, McGrew, Dalrymple, & Jung, 2010; Ruble, & McGrew, 2013; Tazebas, 2000). Smith and Brownell (1995) pointed out that the IEP prepared for children with special needs ensures that the most appropriate educational decisions are made for these children and that it is a document that enables them to take their existing potentials to a higher level.

To increase the quantity and quality of scientific studies conducted in certain fields or subjects, bibliometric researches are applied in which the publications produced are examined using mathematical and statistical methods. The bibliometric analysis method, which is one of the leading analyzes in the decision-making process related to science (Van Nunen, Li, Reniers, & Ponnet, 2018), is one of the techniques that enable the macroscopic, in other words, panoramic examination of the literature in a specific field or subject. With this analysis method, by revealing information on the characteristics of the scientific publications on the subject dealt with, the status of citation, the areas in which the studied researches have been clustered, what kind of changes they have undergone over the years, the collaborations made in the field (Hall, 2011; Kurutkan & Orhan, 2018), the most influential

authors, publications, prominent journals, countries and institutions can be determined. The bibliometry analysis method is a procedure that is made to evaluate the performance of the most publishing journals, institutions and countries on the subject to be researched and to reveal the latest developments, providing detailed information to researchers, and revealing the science and publication policies of the scientific world and countries (Kurutkan, Orhan, & Kaygisiz, 2017; Van Nunen et al., 2017; Wang, Pan, Ke, Wang, & Wei, 2014). Therefore, the examination of journals and scientific studies related to a certain discipline with the method of bibliometry analysis reveals the development of scientific studies in the relevant field and enables solutions to be found by identifying problems or deficiencies. (Kozak, 2003; Ulu & Akdag, 2015).

When the literature is examined, it is observed that there are studies about how IEP applications are carried out and their effects and results in different countries (Cuhadar, 2006; Fiscus & Mandell, 2002; Hettleman, 2004; Kontu & Pirttimaa, 2008; Menlove, Hudson & Suter, 2001; Santos, 2012). On the other hand, no bibliometric analysis of studies on IEP applications in the early childhood stage was found to reveal details about the social and intellectual structures of the publications. With this study, the bibliometric profile of the studies dealing with IEP in the early childhood stage was determined and examined in depth in parameters such as author, journal, country, institution and reference. In addition, by revealing the basic features of these studies, researchers have been presented with a broad perspective on the subject. Due to the lack of bibliometry studies on IEP in the early childhood stage in the world literature, it is thought that this study will fill an essential shortcoming in the field and will contribute to the literature by shedding light on future assignments.

The study aims to examine in detail the characteristics and tendencies of IEP in the early childhood stage by considering the bibliometric evaluation of the scientific publications made in the historical process. In line with this primary purpose, the following questions were sought.

(1) What are the general descriptive data (number of publications, authors, references and related indexes) of IEP research in early childhood education?

(2) What is the social and intellectual structure of IEP research in early childhood education (collaborations, social networks, concept maps)?

METHOD

Research Model

This research is a qualitative study based on a systematic analysis of mixed methods via the bibliometric analysis using the R programming language. A systematic analysis is a literature review that collects and critically analyzes multiple research studies or papers on a topic or question (Davies, 2004). Purposive sampling method and criterion sampling technique, which is common in qualitative research methods (Palys, 2008), were used, and keywords were sampling criteria. This study, which examines the bibliometric profile of scientific publications on IEP applications in early childhood education literature, is a descriptive one. Bibliometry can be defined as a set of methods that are used in the quantitative analysis of scientific studies published in a particular subject or field with mathematical and statistical tools, revealing information such as author, citation, institution, a country in the relevant topic or area, and offering a panoramic perspective for research (Bellis, 2009; Dogru, Guzeller & Celik, 2019; Rongying, & Limin, 2010).

Research Data

The data of this research consists of 108 scientific publications published between 1977-2019 in journals scanned the Scopus database due to the search made on 07.05.2020. The studies in the literature are available in different databases such as WOS, Scopus, Pubmed, Proquest. It is claimed that articles written in social sciences are found in WOS and Scopus databases, and Scopus offers a broader scanning scope (Martin Martin, Orduna Malea, Thelwall, & Lopez-Cozar, 2018).

Data Collection and Analysis

In the analysis processes, an open-source code R statistics program was preferred. The "bibliometrics" package, one of the packages of the program developed for bibliometric analysis, was used (Aria & Cuccurullo, 2017). The descriptive, social and intellectual structure of the data obtained from the study areas with the bibliometric methods used in the study was examined. To reach studies on IEP applications in the early childhood stage, English studies in which the words "early childhood education" or "preschool" together with the words "individualized education program" or "IEP" are filtered through the Scopus database with the help of the parameters below and downloaded in BibTeX format. While searching on the Scopus database, TITLE-ABS-KEY ("early childhood education" OR "preschool") AND TITLE-ABS-KEY (IEP OR "Individualized Education Program") AND (LIMIT-TO (LANGUAGE, "English") parameter has been determined. Descriptive analyses, conceptual structure map analysis, collaboration network analysis, historical direct citation analysis were applied by uploading the data to the R program via the bibliometric package. Thus, it was possible to reveal the intellectual and social structure related to the subject

dealt with in bibliometric research (Ramos - Rodriguez, & Ruiz - Navarro, 2004; Liu, Yin, Liu, & Dunford, 2015). The data included in the analysis within the scope of the study are general descriptive data and collaborations such as publications, authors, reference numbers and indexes related to these 108 publications, and the social and intellectual structure of magazines such as social networks and concept maps.

FINDINGS

1. General Descriptive Findings

Descriptive bibliometric informations of IEP applications in early childhood are given in Table 1.

Table 1. Descriptive Bibliometric Informations of IEP applications in early childhood education

Explanation	Result
Number of citations per study	18.43
Number of contributing authors	390
Studies with multiple authors	88
Studies with a single author	20
Number of studies per author	0.28
Number of authors per document	3.61
Average number of co-authors in studies	3.82
Collaboration Index (CI)	4.2

According to the information given in Table 1, it is determined that 20 of 108 studies in the Scopus database were carried out with the participation of a single author over 43 years, whereas the average number of co-authors in the studies was 3.82. The number of authors per document is 3.61. While the average number of co-authors expresses the average number of names seen in research in the field, the number of authors per document is a value obtained by dividing the total number of studies by the total number of authors. The difference between these two values is explained by the fact that any author is involved in more than one study. However, the Collaboration Index (CI value) is calculated to avoid the confusion that these two concepts can create (Ajiferuke, Burell, & Tague, 1988). The CI value reveals the number of authors per publication in multi-authors publications, calculated only on the collaboration of studies with multiple authors. The CI value of the studies discussed in this research was found to be 4.2. According to another finding of the study, the average number of citations per 108 studies on IEP in early childhood education is 18.43.

Figure 1 shows the distribution of the studies over the years.

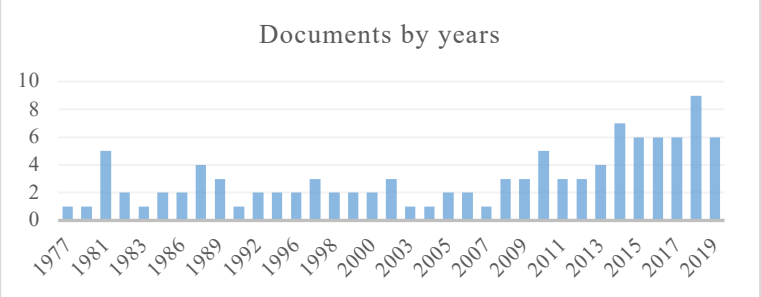


Figure 1. Distribution of studies by years

It was observed that most of the studies in the literature consisted of articles (n = 100). Additionally, there are 3 book chapters, 4 reviews and 1 research note among the studies. It has been determined that the Compound annual growth rate (CAGR) of the studies in the literature in the 43 years was 5.41%. CAGR shows the state of geometric progression that provides a constant rate over the historical process. Despite the relatively low CAGR value, it is understood that the studies tend to increase in the last 10 years (Figure 1).

Table 2 shows the author impacts.

Table 1. Author Impacts

Author	h-index	g-index	m-index	TC	NP	FPY
Horn E.	1	2	0.05	61	2	2000
Ruble L.A.	2	2	0.18	59	2	2010
Hemmeter M.L.	2	2	0.09	50	2	1998
Mcgrew J.H.	2	2	0.25	37	2	2013
Kontos S	2	2	0.09	25	2	1998
Bruder M.B.	2	2	0.33	16	2	2015
Justice L.M.	2	2	0.29	13	2	2014
Schmitt M.B.	2	2	0.29	13	2	2014
Atwater J.	2	2	0.66	4	2	2018
Greenwood C.R.	2	2	0.66	4	2	2018

TC: Total Citation, NP: Number of Publications, FPY: First Publication Years

According to the information given in Table 2, Horn E., Ruble L.A. and Hemmeter M.L. seem to be the researchers with the highest number of citations. All of the researchers in Table 2 have two studies on IEP applications in the early childhood stage. It is understood that Hemmeter M.L. and Kontos S. were included in the literature with their studies in 1998. Almost all researchers have equal h-index and g-index values in the context of studies on IEP applications in early childhood education. However, since the first years of research of Atwater J. and Greenwood C.R. are close, m-index values (0.66) differ positively from other authors.

Table 3 shows the most cited articles.

Table 2. Most Cited Articles

Title	Citation	TC	TCpY
1.Cognitive and Behavioral Outcomes After Early Exposure to Anesthesia and Surgery	Flick et.al., 2011	477	47.70
2.Longitudinal study of children with unilateral hearing loss	Lieu et.al., 2012	104	11.56
3.Positive association between attention-deficit/hyperactivity disorder medication use and academic achievement during elementary school	Sheffler et.al., 2009	92	7.67
4.Educational interventions in learning disabilities	Lerner, 1989	79	2.47
5.Salvage Therapy of Progressive and Recurrent Hodgkin's Disease: Results From a Multicenter Study of the Pediatric DAL/GPOH-HD Study Group	Schellong et.al., 2005	65	4.06
6.Increasing implementation of special education instruction in mainstream preschools: Direct and generalized effects of nondirective consultation	Peck et.al., 1989	65	2.03
7.The Pediatrician's Role in Development and Implementation of an Individual Education Plan (IEP) and/or an Individual Family Service Plan (IFSP)	Committee on Children with Disabilities 1999	62	2.82
8.Supporting young children's IEP goals in inclusive settings through embedded learning opportunities	Horn et.al., 2000	61	2.90
9.Examining the quality of IEPs for young children with autism	Ruble et.al., 2010	54	4.91
10. Team collaborative practices between teachers and occupational therapists	Barnes & Turner, 2001	50	2.50

TC: Total Citation, TCpY: Total Citation per Year

In Table 3, when the 10 most cited publications among the studies on IEP applications in early childhood education are examined, it was found that Flick et al.'s (2011) study received 477 citations, and Lieu, Tye-Murray, Fu's (2012) research received 104 medals, although they were published in relatively recent years. Although the total number of citations of some studies was high, it was observed that the annual average number of sources remained below 3.

Table 4 shows the journal impacts.

Table 4. Journal Impacts

Journal	h-index	g-index	m-index	TC	NP	FPY
Exceptional Children	4	6	0.10	74	6	1981
Journal of Early Intervention	5	6	0.13	72	6	1981
Topics in Early Childhood Special Education	5	6	0.21	131	6	1997
Journal of Autism And Developmental Disorders	3	3	0.27	95	3	2010
Pediatrics	3	3	0.14	631	3	1999
Young Exceptıonal Children	3	3	0.13	36	3	1998
Academic Pediatrics	2	2	0.18	41	2	2010
Federal Register	1	2	0.07	4	2	2007
Journal of Developmental and Behavioral Pediatrics	1	1	0.08	2	2	2008
Pediatric Physical Therapy	2	2	0.13	24	2	2005

TC: Total Citation, NP: Number of Publications, FPY: First Publication Years

When the impact values and publication information of the journals in which the studies on IEP applications in the early childhood stage are analyzed in Table 4, it is seen that the journals "Exceptional Children," "Journal of Early Intervention," and "Topics in Early Childhood Special Education" have the highest number of publications (n = 6) in the field and are the first to include publications. Even though it contains only 3 publications on the subject, it is understood that the most-cited journal in Pediatrics (n = 631). In connection with the closeness of the first publication year (2010) and the number of citations (95), the m-index value of the Journal of Autism and Developmental Disorders (0.27) was found to be higher than that of other journals. It is seen that the g-index and h-index values of the first three journals with the highest number of publications in the field differ from other journals in a positive sense.

2. Social and Intelectual Findings

2.1. Key Words and Factors

It is observed that the authors use a total of 233 different keywords in their studies. However, 813 Key Words Plus (KWP) were detected. The data contained in KWP are words or phrases that often appear in the titles of an article's references, but not in its own title (Garfield & Sher, 1993).

Figure 2 shows the world cloud and Figure 3 shows the Conceptual Structure Map.



Figure 1. Word Cloud

In Figure 2, when the word cloud obtained according to the logarithmic frequencies of the KWP data of the studies obtained within the scope of the study is examined, it is seen that words or phrases such as child, human, education, humans, female, male, adolescent, preschool child come to the fore. Logarithmic frequency-based representation helps the numerical data of words be displayed compactly even if they are in a wide range of values (Dehaene, Izard, Spelke, & Pica, 2008). In word clouds based on linear frequency distribution, the words' visibility level is less frequent because the terms are shown in parallel with the ratio of their numerical values to each other. In this context, the phrase cloud visualized in Figure 2 represents the most frequently used 50 KWP data.



Figure 3. Conceptual Structure Map

The words' approach to the zero points in the two-dimensional representation set out in the conceptual structure map obtained using the MCA method based on the KWP data in the studies discussed in Figure 3 shows that their everyday use in research has increased. The divergence of words from the zero point represents dissociated research. The concepts in the display and characterized by different colors represent clusters of studies with standard KWP data. When the groups formed by the words are examined, it is seen that the red collection represents individuals and management processes, the green cluster represents the variables in the study, the blue set represents education-oriented studies, and the purple group represents legal approaches.

1.1. Network Analysis

Values of the authors' impact factors (Table 2) provide information about the authors who significantly influence the literature. However, it is not possible to say that these data alone are sufficient. Historical Direct Citation analysis, which presents an intellectual flow, was applied to provide additional information to the data in Table 2.

Figure 4 shows the historical direct citation network, and Figure 5 shows the collaboration network.

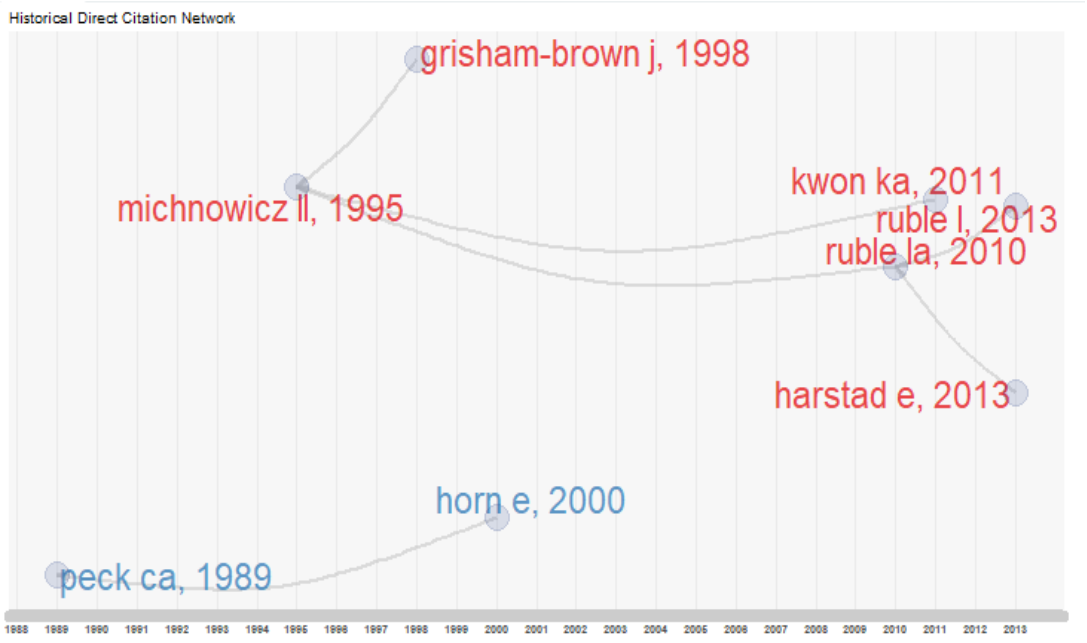


Figure 2. Historical Direct Citation Network

In Figure 4, researchers have examined which researchers have affected the researchers in a historical section to what extent, and it has been observed that the publications of some researchers directly affect other publications even after years. In this context, Peck, Killen, & Baumgart, D (1989) is seen to have affected Horn et al. (2000). Likewise, it is understood that the study of Michnowicz, McConnell, Peterson, & Odom (1995) has directly affected some studies (Grisham-Brown & Hemmeter, 1998; Harstad, Huntington, Bacic, & Barbaresi, 2013; Kwon, Elicker, & Kontos, 2011; Ruble et al., 2010; Ruble et al., 2013) for 18 years.

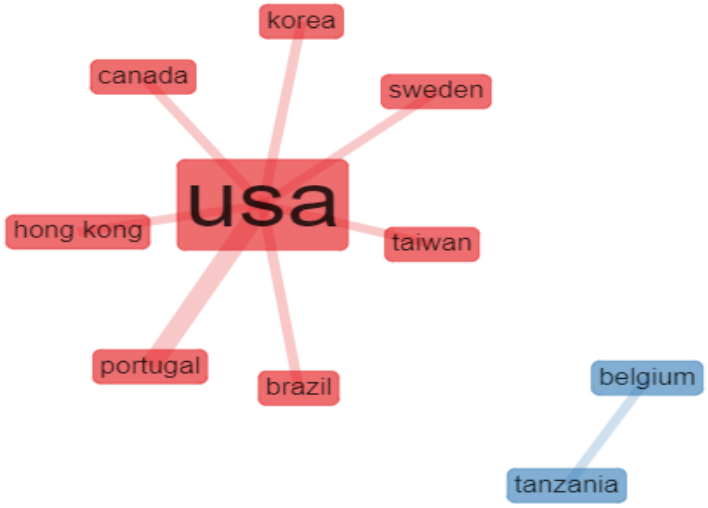


Figure 3. Collaboration Network

The country x country adjacency matrix determined according to the frequency of co-broadcasting is used in the cooperation network in the study. When Figure 5 is analyzed, where publications jointly made by individuals or organizations are presented through a social network, it is understood that a limited number of countries cooperate. The size of the nodes (the area covered by the country names) in the web gives an idea about the broadcast frequencies of the nations. The colors of the nodes indicate the clusters they belong to in the context of their association. The thickness of the edges between the nodes indicates the frequency of the relationship. While visualizing Figure 5, the "Fruchterman-Reingold" power-based order algorithm and the "association" normalization method are applied. In this connection, it is seen that among the countries in the red cluster (USA, Hong Kong, Portugal, Brazil, Taiwan, Sweden, Korea, Canada) and between the countries in the blue set (Belgium, Tanzania) mainly broadcast together.

DISCUSSION

In this study, 108 different English studies about IEP applications in early childhood education, published in journals scanned in the Scopus database from 1977 to 2019, were identified, and their descriptive, social and intellectual structure was examined with the help of bibliometric techniques. When the results obtained in the research findings are evaluated, it is seen that studies with multi-authors are preferred more in studies dealing with IEP in early childhood education in the Scopus database over 43 years. The number of authors per document is 3.61 in studies with multiple authors reveals that these studies are conducted in teams of 3 or 4 people. Having lessons with various authors in scientific research increases the quality of the study by bringing together the knowledge of different authors (Evren & Kozak, 2012). Therefore, the high number of collaborative studies with multiple authors on the relevant subject contributes to world literature. The CI value of 4.2, which is calculated only based on collaborations in studies with various authors and reveals the number of authors per publication, indicates that many people are willing to contribute to the tasks simultaneously. The relatively low number of studies per author in the study (0.28) can be interpreted as a higher number of authors than the number of studies conducted.

Depending on another result of the study, it is seen that the studies conducted mainly consist of articles, and the lessons that were taught have increased in the last 10 years. This finding reveals that interest in IEP in early childhood education has risen rapidly in recent years. This result which based on studies that demonstrate the effect of the content and quality of IEP applications in early childhood education on the development of children with special needs (Boavida, Aguiar, & McWilliam, 2014; Diamond & Carpenter, 2000; Grisham-Brown, & Hemmeter, 1998; Horn et al., 2000, O'Connor, & Yasik, 2007; Ozturk et al., 2010; Pretti-Frontczak & Bricker, 2000; Ruble et al., 2010; Ruble et al., 2013; Tazebas, 2000) suggests that it may have led to increased interest in this subject.

As stated in another finding of the research, it is observed that the most cited authors among the studies discussed within the scope of the survey are Horn (2000), Ruble (2010) and Hemmeter (1998). It was determined that each of these authors conducted

two studies on IEP in the early childhood stage. Horn (2000), with the work named "Supporting young children's IEP goals in inclusive settings through embedded learning opportunities" and Ruble (2010) with the result named "Teacher and child predictors of achieving IEP goals of children with autism" and Hemmeter (1998) with the work titled as "Writing IEP goals and objectives: Reflecting an activity-based approach to instruction for young children with disabilities," they made their first publications in this field. Although the number of authors (n = 390) who contributed to the studies on IEP in the early childhood stage is relatively high, it is an exciting finding that the authors have published at most twice on this subject. It is noteworthy that the h-index and g-index values of the authors working on IEP in the early childhood stage are generally equal to each other, but because their first years of study are close to each other, the m-index values of the authors named Atwater J. and Greenwood C.R. differ from other authors in a positive sense. This result reveals that the h-index or g-index values alone are insufficient in evaluating the studies conducted in a particular field. Based on this result, it can be said that more data are needed to determine which author is more effective in evaluations made in certain areas.

Another finding of the study shows that Flick et al.'s (2011) study titled "Cognitive and Behavioral Outcomes After Early Exposure to Anesthesia and Surgery" was most cited with 477 citations, and Lieu et al. (2012) "Longitudinal study of children with unilateral hearing loss" is the second study with 104 sources. Sheffler et al.'s (2009) study "Positive association between attention-deficit / hyperactivity disorder medication use and academic achievement during elementary school" is the third cited. When the contents of the most cited articles and the journals they were published in were examined, it was seen that all three studies were mainly studies in the field of health and were included in journals published in the field of medicine. Although the concept of IEP is a concept that concerns educational environments, this finding reveals that studies conducted with a multidisciplinary approach in health sciences and educational sciences receive more citations. Thus they are considered as more qualified studies. Even though the number of sources reflects the quality of a publication, Smith (2007) is also highly correlated with the time elapsed since the publication of a study (Qiu & Chen, 2009). Therefore, although it is thought that studies with an older publication date will receive more citations, it is noteworthy that the most cited studies within the scope of the research are more recent compared to other studies. Even if the studies conducted in relatively old dates have contributed significantly to the field, time passed since the research has decreased the average number of citations. This result gives an idea about the dynamic nature of science. Milfont and Page (2013), with their comments supporting this finding, pointed out that the number of citations being related to the published year does not mean that the recently published studies will have a low impact on the field. Despite the total citation numbers being high in some studies (Lerner, 1989; Peck et al., 1989; Committee on Children with Disabilities, 1999; Horn et al., 2000; Barnes & Turner, 2001), the annual average citation numbers remained below three. According to this result, it is seen that the authors mentioned above receive more citations in specific periods, and the distribution of sources by years is at three levels. When the publication dates of these studies are considered, it is seen that the studies are old-dated. In this context, it can be thought that interest in these studies has decreased over the years, and the number of annual citations has decreased accordingly.

When the journals that publish the highest number of publications on IEP in the early childhood stage are examined, it is evident that the journals "Exceptional Children," "Journal of Early Intervention," and "Topics in Early Childhood Special Education" have the most publications on IEP in early childhood stage. Among these journals, "Exceptional Children" and "Journal of Early Intervention" were the first journals to include publications on IEP in early childhood education in 1981. Significantly, the journals within the scope of the research are concentrated in the field of education; nonetheless, the effect of journals in the field of medicine is relatively high. It is a remarkable finding that the Pediatrics journal, in which studies in medicine are published, is the most cited, although only 3 publications have been published on the subject. In this context, it can be said that the pediatrics journal, which includes publications in the field of medicine, contains qualified studies on IEP. Asan (2017) pointed out that citing a study published in a scientific journal in other publications is an essential criterion for the journals in which the publications are included in the scope of international indexes. The fact that the most frequently cited studies on IEP in the early childhood stage are primarily in the field of medicine reveal that in recent years, with the increase of interest in special education and therefore IEP in the early childhood stage, studies in the field of medicine besides the field of education, have increased. Therefore, depending on this finding, it can be mentioned that there are multidisciplinary perspectives in the studies and their positive contribution to the field. Researches made in different disciplines related to the subject may have enabled the studies dealing with IEP in early childhood education to become widespread in recent years. Another remarkable finding of the study is that the Journal of Autism and Developmental Disorders journal has a higher m-index value than other journals. The higher m index value of the relevant journal may be that the Journal of Autism and Developmental Disorders includes relatively more recent publications, and the number of citations to published studies is high due to the high number of qualified studies.

It is seen that the g-index and h-index values of the first three journals (Exceptional Children, Journal of Early Intervention, Topics in Early Childhood Special Education) with the highest number of publications in the field differ positively from other journals. Indexes such as h, g, m are a value that shows how many of the publications used in evaluating scientists, journals, institutions and countries are cited above a particular value (Al, 2008; Arencibia-Jorge, Barrios-Almaguer, Fernández Hernazi and Carvajal–Espino, 2008; Braun, Glänzel, & Schubert, 2006, Czajbók, Berhidi, Vasas, & Schubert, 2007). Therefore, when evaluating the outcomes of scientific research, the h-index is preferred rather than criteria such as the total number of publications used, the total number of citations, the number of citations per publication, the number of important publications, and the total number of

sources to significant publications (Hirsch, 2005). The high number of citations alone does not make the h-index high. Consequently, the h-index value of the studies or journals with a small number of publications with a high number of citations is below. Although Pediatrics journal is the most cited (n = 631) journal, the reason for its lower h index compared to other journals may be that it includes only three publications on the subject.

It was determined that the most famous words or word clouds in the word cloud formed according to the logarithmic frequencies of the KWP data of studies on IEP in early childhood education are children, human, education, humans, females, males, adolescent, preschool child. It can be said that it is an expected result that the keywords selected on the relevant subject focus on children and education. According to the clusters of words and the results of the findings, it is seen that the most common themes revealed in the researches are individuals and management processes, variables dealt with in research, education-based studies and finally, legal approaches. As stated by this finding, it can be said that the least emphasized subject in the studies conducted in the legal context, such as laws and regulations.

As a result of the Historical Direct Citation analysis, which was carried out with the thought that it was not enough to consider the authors' impact factors alone, it was examined which researchers influenced which researchers in the historical process. Horn et al. (2000), who was the most cited author in his studies on IEP in early childhood education, was influenced by the study titled "Increasing implementation of special education instruction in mainstream preschools: Direct and generalized effects of nondirective consultation" published by Peck et al. in 1989 in the Journal of Applied Behavior Analysis. However, it was concluded that the study titled "Social goals and objectives of preschool IEPs: A content analysis" published by Michnowicz et al. in the Journal of Early Intervention in 1995 directly affected the publications of many researchers for 18 years (Grisham-Brown & Hemmeter, 1998; Harstad et al., 2013; Kwon et al., 2011; Ruble, 2010; Ruble et al., 2013).

According to the latest findings obtained from the research, it is understood that cooperation between countries is quite limited in studies dealing with IEP in early childhood education. In the collaborative studies, the studies originating from the United States come to the fore in the cooperation network. It is seen that US-based studies were conducted with (Hong Kong, Portugal, Brazil, Taiwan, Sweden, Korea and Canada). IEP for children who receive inclusive education was first put into practice with the PL.94-142 law enacted in the USA in 1975. Therefore, it can be said that the study done in the USA on this issue is predominant and is at the center of the cooperation network with other countries. Apart from these countries, it has been determined that collaborative studies are conducted between Belgium and Tanzania. By this result of the research, it can be said that countries with geographic proximity, in general, tend to publish studies together.

CONCLUSION AND RECOMMENDATIONS

In conclusion, in this study, the literature on IEP applications, which are critical for children with special needs in early childhood practices, was reviewed, and the characteristics of the studies were revealed. In this context, this research is essential in providing descriptive, social and intellectual information about the subject to those who want to do new research on this subject. As studies on this subject increase, the quality of the practices related to meeting the needs of children with special needs and families in the early childhood stage will also increase.

This study has some limitations. First, the bibliometric analysis used in this study draws a general framework for the field but does not provide a detailed content analysis. Some authors' research may not be accessible in bibliometric research because they do not include possible search terms in titles, keywords, and abstracts on the relevant topic. For this reason, studies that are thought to be effective in the field can be ignored. In this study, only English publications in the Scopus database were considered. Hence, qualified studies published in different databases or in other languages on IEP in the early childhood stage researched within the scope of this study may not have been identified. Therefore, it is recommended to scan the tasks in different languages and include WOS, Google Scholar, Pubmed, Proquest in the studies.

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Statements of publication ethics

I hereby declare that the study has not unethical issues and that research and publication ethics have been observed carefully.

Researchers' contribution rate

This research was conducted with a single author. I declare that all actions taken during the research process belong to me.

Ethics Committee Approval Information

This research is a qualitative study based on systematic analysis of the articles on mixed methods via the bibliometric analysis. Since human and animal subjects are not used in this study ethics committee approval is not required according to the TR Index Journal Evaluation criteria.

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