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Enrichment Studies in Gifted Education: A Bibliometric Analysis with RStudio

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Gifted students are exceptional learners who need differentiated education. Enrichment is the most prevalent differentiation strategy including supplementation learning experiences of the depth, breadth, or intensity of content and process as appropriate to the student's abilities and needs. Given the importance of assuring such education, the aim of this study is to investigate the trends related to enrichment in recent years by focusing on the bibliometric results of previous studies in the literature on enrichment in gifted education. For this goal, a total of 296 publications on enrichment gathered from Scopus and Web of Science databases were analyzed in terms of different bibliometric variables, and they were presented with visuals and tables. The PRISMA model was used for data collection and RStudio was employed for data analysis and image/table creation. The results of the study showed that the most frequently used keywords in research in both databases were "enrichment program" and "gifted students". In both databases, the countries that had the highest number of publications were determined as USA and Germany. Furthermore, it was also determined that the top three most cited authors in scientific creativity studies in both databases were Joseph Renzulli, Sally M. Reis, and Marcia Gentry. The highest number of published contributions to the field was made by the University of Connecticut and Purdue University. The most active journals in the field are Gifted Education International and Roeper Review. Researchers interested in enrichment for gifted students can benefit from the results of the present study.

Introduction

Giftedness is viewed as the superiority of individuals over peers in many abilities and gifted students are described as different for several traits including cognitive, creative, affective, and behavioural levels (Reis-Jorge et al., 2021). Due to the age-old mentioned unique characteristics of gifted and talented students, regular education systems fall short in addressing

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the special needs in schools and many of them cause lag in school achievement, decrease in motivation, development of negative attitudes toward school, or even talent losses (Besançon, 2013; Heller et al., 2000). Therefore, gifted students need opportunities to nurture and develop their knowledge acquisition, creative skills, and thinking skills (Sternberg, 2005b). These opportunities encompass differentiation in curriculum elements (Tomlinson, 2017; Tomlinson & Jarvis, 2009) regarding the student's needs, interests, and abilities (Roberts & Inman, 2007). If so, there will emerge an increase in the world's reservoir of creative/productive people such as Nobel Prize winners, best-selling authors, or composers, or other people who have succeeded in national or world reputation (Davis et al., 2014).

Among the several efforts for differentiating the learning process, in which gifted students are allowed to work at their own rapid learning pace and providing gifted students with appropriate and effective learning experiences, enrichment strategies have been the most prevalent educational practices for more than forty years (Gubbels et al., 2014; Reis et al., 2021). Enrichment strategies generally offer opportunities for much variety in content; greater depth; and the development of affective, creative, scientific, and other high-level skills (Davis et al., 2014). As such, enrichment strategies are good at supporting higher levels of thinking and creativity in a subject field and help students to explore that subject in depth (Fox, 1979). Therefore, enrichment programs with suitable curricula components for gifted students enable opportunities for nurturing their talents (Kim, 2016). In this respect, Aljughaiman and Ayoub (2012) attribute enrichment strategies as the most prominent kind of school programs in the education of gifted students, and these strategies are adopted by many institutions across the globe (Feldhusen, 1994; Olenchak & Renzulli, 1989; Reis et al., 2008).

For many decades many different enrichment theories have been proposed (e.g., Renzulli, 1977; Sternberg, 2005b) and developed, and numerous researchers explored various aspects of enrichment programs and strategies. These aspects generally include the effects of enrichment programs on academic achievement, thinking skills, learning skills, affective skills, or attitude towards a certain field (Aljughaiman & Ayoub, 2012; Kim, 2016; Subotnik & Rickoff, 2010). In this line, for example, Gubbels et al. (2014) explored socio-emotional and attitudinal effects of a triarchic pull-out program for gifted students in the Netherlands. In that study, it was found that the applied enrichment program has positive effects on practical intelligence abilities in gifted elementary school children. Aljughaiman and Ayoub (2012) explored the effects of a school enrichment program on the analytical, creative, and practical abilities of elementary gifted students. Regarding the teachers' competency in applying suitable enrichment strategies, Brigandi et al. (2019) studied the effects of participating in professional development in Renzulli's Enrichment Triad Model on teachers' knowledge and practice in the gifted classroom. Furthermore, Miedijensky and Tal (2016) studied the appropriate assessment strategies for enrichment learning activities where the aim is to foster students' reflective skills and metacognitive thinking processes. Finally, Kim (2016) conducted meta-analysis research related to the Effects of Enrichment Programs on Gifted Students' diverse abilities. The study examined the results of the current studies between 1985 and 2014 and illustrated that, in general, enrichment programs are effective in nurturing and fostering gifted students' abilities.

Scholars used various methods to produce knowledge about enrichment pedagogy and its effects on the provision of gifted students. But there is a lacuna in the literature regarding demonstrating detailed and comprehensive information about the research in enrichment studies. In this line, this study aims to conduct a bibliometric analysis to bridge this gap. Therefore, the present study aims to synthesize existing studies related to enrichment in gifted education. The findings of the present study will provide a general overview of the field and

recommendations will be presented for future studies (Şakar & Baloğlu, 2022). Within the scope of these objectives and abovementioned concerns, the following research questions were explored in the present study:

(1) How is the distribution of the publications in terms of their authors, year of publication, type of publication, the country and institution where they are published, and journals?
(2) How were the collaborations among scholars constructed?
(3) How do the publication charts of the most published journals on the subject appear?
(4) Which studies are the most cited in the field of enrichment?
(5) What are the most commonly used keywords in the subject area, among the list of keywords, and in abstracts and titles?
(6) What are the changing and up-to-date trends in the studies carried out in this field?

Theoretical Framework

This study is framed in the literature related to the learning characteristics of gifted students, enrichment, and enrichment strategies. Next, we discuss each of these theoretical consideration foci in turn.

Gifted Learners

While IQ had been accepted as a single measure of giftedness for a long time, for a few decades, it has been considered a multidimensional construct including creativity or socioemotional variable (Kaufman & Sternberg, 2008). For example, Triarchic Theory of Intelligence developed by Sternberg (2005a), Gagné's (2004) DMGT or Renzulli's (1986) three-ring model of giftedness views including multiple factors and variables. Furthermore, (Yurtçu et al., 2021) the concept of Giftedness is confused with many concepts. In this respect, (Renzulli et al., 1982) tried to eliminate the confusion by examining this concept under two categories as schoolhouse giftedness and creative-productive giftedness. Due to their unique characteristics, gifted learners are more advanced and superior to their peers in areas such as cognitive, social, emotional, and creative (Renzulli, 1986). Therefore, they are in a better position regarding physical, perceptual, analysis, synthesis, problem-solving, abstract thinking, logical process, language skills, and creativity (Kurup et al., 2015). In regular schools, these learning characteristics and advantages generally turn into disadvantages since the standard curriculum and classroom activities are insufficient for creating cognitive, creative, and affective challenges for gifted learners (Reis-Jorge et al., 2021). For this reason, many efforts for meeting the educational needs of gifted learners have been done as differentiation of curriculum components which are content, process, learning products, and environment that is both physical and social (Tomlinson, 2017).

Enrichment

Differentiation strategies over curriculum components generally include acceleration, grouping, and enrichment (Tomlinson, 2017). There is a general confusion between acceleration and enrichment. In this respect, (Davis et al., 2014, p. 127) posit that the distinction is simple, and it can be considered as "acceleration implies moving faster through academic content, which typically includes offering standard curriculum to students at a younger-than-usual age". In this respect, enrichment is a teacher's proactively and planned effort to differentiate curriculum, instructional strategies, and classroom assessments based on student

data to modify the curriculum elements which are content, process, product, and learning environment that is based on student readiness, interests, and learning profiles (Reis et al., 2021; Tomlinson, 2017). Therefore, enrichment is conceptualized as implying a supplementation of the depth, breadth, or intensity of content and process as appropriate to the student's abilities and needs. Furthermore, Davis et al. (2014, p. 128) described enrichment as the "richer and more varied educational experiences, a curriculum that is modified to provide greater depth and breadth than is generally provided". This study has a parallel consideration with Schiever and Maker (2003) in the description of enrichment curriculum or program strategies which are — programs or curricula that have adapted content with more depth or breadth than generally provided or that have an adjusted process to develop a learner's higher intellectual thinking and to provide opportunities for creative learning production.

Enrichment Pedagogy and Strategies

According to Reis et al. (2021), enrichment pedagogy is based on learners' strengths and interests which allow students "to experience advanced-level learning, critical and creative thinking and problem solving, and the motivation to pursue rigorous and rewarding work". In this respect, Reis et al. (2021) add that, the strategies based on such pedagogical aims to increase student effort, enjoyment, and performance, and for integrating a range of advanced-level learning experiences and thinking skills into all curricular areas. In the end, the enrichment pedagogy comprises the highest student engagement which is both independent and autonomous, according to their gifts and talents. Such an engagement consists of student development of investigative creative problem-solving abilities and creativity and integrating the tools of the practicing professionals in the development of products (Inman, 2023; Reis et al., 2021; Tomlinson, 2017). Regarding the nature of enrichment strategies, Davis et al. (2014) asserts that these teaching strategies are delivery methods for achieving process and content goals (italics original). While the process goals generally purport to develop creative thinking abilities, problem-solving skills, and scientific thinking abilities, content goals engage the subject matter and activities in which the processes are developed. Besides the process and content goals, the enrichment programs are designed in a way to foster social and behavioral skills as well (Aljughaiman & Ayoub, 2012; Kim, 2016; Reis et al., 2008).

Renzulli's (1986) enrichment triad model is a good example that shelters a pedagogical approach of a bona fide enrichment program. It focuses on "in-depth materials on a topic, materials for the development of higher-level thinking processes and skills, self-selected independent projects, or authentic products or services for a real-world audience" (Fiddyment, 2014). The triad model consists of three parts or stages. In Type 1 Enrichment students are exposed to various topics, areas of interest, and fields of study and they explored their interest areas. In the Type 2 Enrichment activities students are taught about advanced content, developed thinking skills, creative problem-solving, and research skills required by the selected interest area. Finally, Type 3 Enrichment, which is generally suggested for high-ability learners, includes opportunities, resources, and support for applying the knowledge and skills obtained in the Type 2 Enrichment activities over the problems and areas of interest that are selected in the Type 1 Enrichment activities.

Method

Research design

Descriptive research method was employed in this study in order to reveal current cases in a definite issue (Gravetter & Forzano, 2018). The majority of educational research is descriptive in nature. These studies involve describing various variables within the research and comparing them. This helps in identifying similarities and differences, categorizing, and analyzing them, and interpreting the findings by focusing on individuals, groups, institutions, methods, and materials (Cohen et al., 2007). The current study focuses on analysing and interpreting educational research related to enrichment studies in gifted education.

Data collection

Data were collected by following the rigorous protocol (The PRISMA) developed by Moher et al. (2007). The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guideline provides reviewing the studies in the literature systematically. In this study, the literature was reviewed using the Web of Science and Scopus databases on February 1, 2023. The criteria for inclusion and exclusion criteria are listed in Table 1. For instance, basically, the studies must be related to enrichment studies in gifted education, be journal articles, not reviews and editorials, and be written in English. How the PRISMA guideline was applied is shown in Figure 1.

Table 1. Inclusion and exclusion criteria

Inclusion	Exclusion
Must -include enrichment studies in gifted education, -be in WoS and Scopus databases -be published before 2023 -be written in English -be accessible	-Including reviews, editorials, early access articles -Not written in English -Not related to enrichment studies in gifted education

The research query used in WoS and Scopus was shown in Table 2:

Table 2. The research query used in WoS and Scopus

Databases	Research query
WoS and Scopus	(“gifted” or “talented” or “highly able” or “intelligent” or “genius”) AND (“enrichment” or “pull out program” or “summer program” or “talent development”)

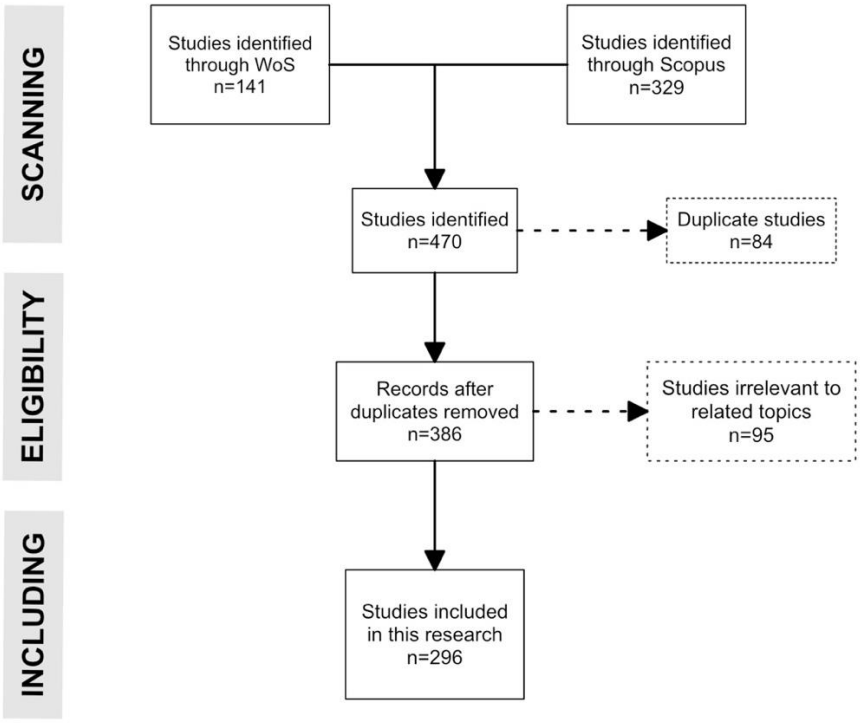

Figure 1. Flow diagram of studies selected

Data analysis

Bibliometric analysis was used to designate distribution of data in detail according to scientific production per year, predominant sources, most contributed authors, most relevant affiliations, the academic contribution of institutions, and countries' production over time, most cited publications, the most common keywords, and the trending topics. The way of analysis enabled us a detailed thematic review. In this way, the most productive authors, affiliations, and countries were specified. Moreover, the conceptual and intellectual put forward in order to map the co-occurrence network and thematic map (including basic, motor, emerging, and niche themes). Thus, the development and the direction of evolution of enrichment studies were revealed. Meanwhile, the collaboration between authors, countries, and affiliations was specified through mapping social structure. The bibliometric analysis enables the mapping of qualitative and quantitative data to reveal how a subject-specific area has evolved over time (de Bakker et al., 2005). It has been a common method in recent years to investigate several characteristics of academic research. In this study, RStudio was used as a medium for bibliometric analysis. It is a very useful tool -integrated with R programming language- for visualizing scientific maps (Gandrud, 2013).

Findings

When presenting the research findings based on bibliometric data regarding enrichment studies, at first the main information about sources, authors, countries, documents, and keywords are given respectively for thematic review. Then, the conceptual, intellectual, and social structures are given to trace the evolution of this subject in the intellectual background comprehensively. Figure 2 below demonstrated the annual scientific production regarding enrichment studies.

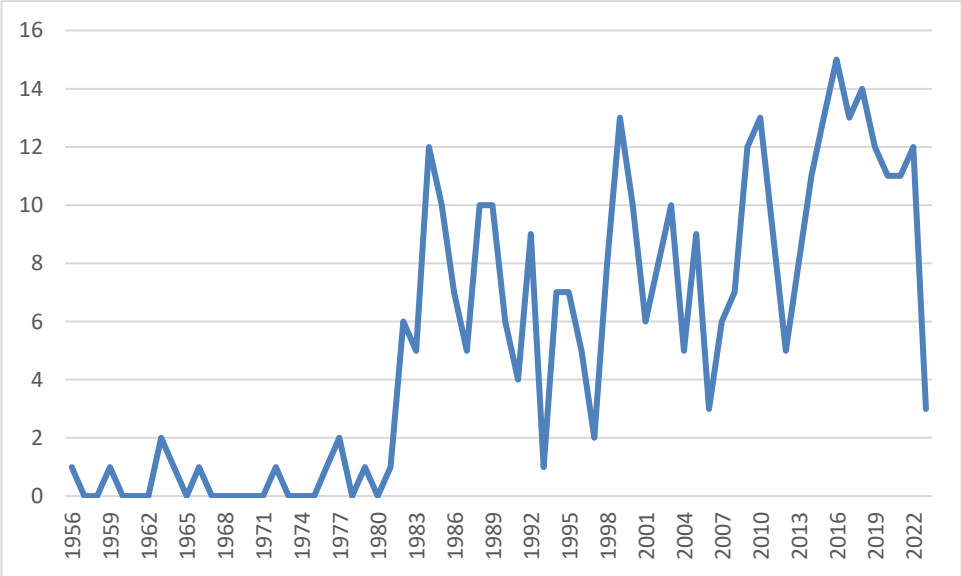

Figure 2. Annual scientific production

Table 3. Main information about data

Time span	1956-2023
Sources	75
Documents	291
Authors	90
International co-authorship %	5.1

When we look at the enrichment-related studies conducted from 1956 to 2023, it is seen that the number of these studies reached peak numbers at intervals of three to four years until 2013, while the number of these studies has been approximately the same in the last decade. It seems that 90 different authors work in this field with 291 studies from 75 different sources and five percent of them have international cooperation among themselves.

When the number of articles published by the sources according to years is analysed through Figure 3, it is seen that Gifted Child Quarterly has been active in the field since 1962, Rooper Review since 1980s, Gifted Education International since 1982, Journal for the Education of Gifted since 1988, and Journal of Advanced Academics since 2010s.

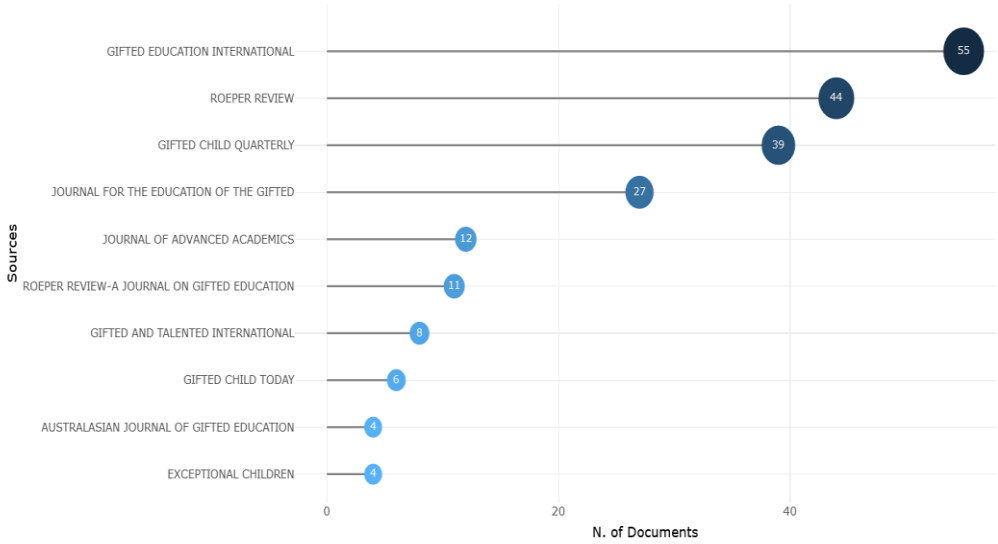

Figure 3. Number of articles and resources

When the predominant sources of these publications are examined, the following four sources come to fore, Gifted Education International (55), Rooper Review (44), Gifted Child Quarterly (39), and Journal for the Education of Gifted (27) respectively. These can be characterized as core resources. It is shown that the number of publications regarding enrichment in these sources increases every year and other sources show interest in the same direction.

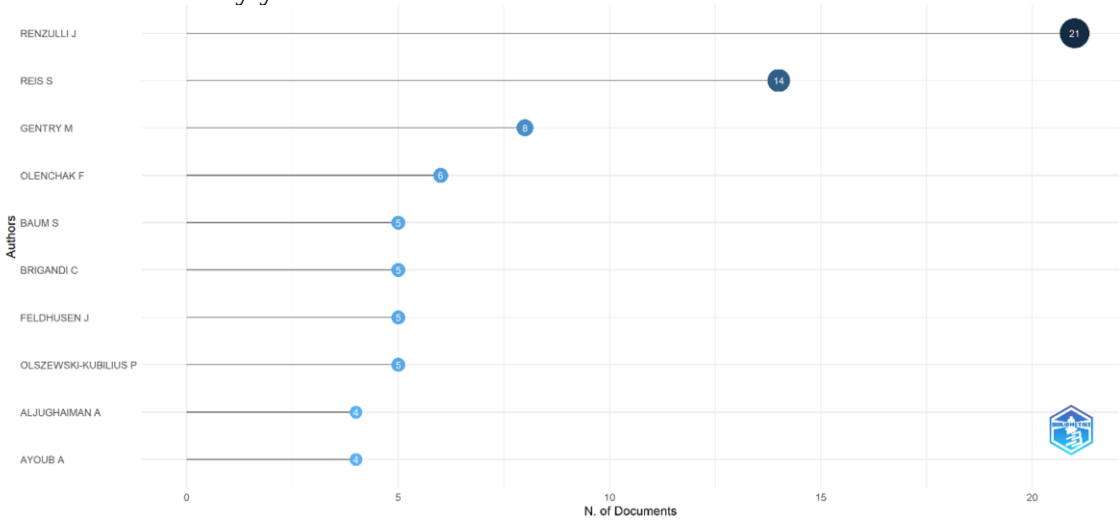

Figure 4. The most relevant authors

When most relevant authors are examined (see Figure 4) in relation to the number of documents, it is seen that Joseph Renzulli contributed 21 articles, Sally Reis 14 articles, Marcia Gentry 8, Richard Olenchak 6 articles. Other authors also have a similar number of articles. it is shown that Renzulli and Reis are the most productive researchers.

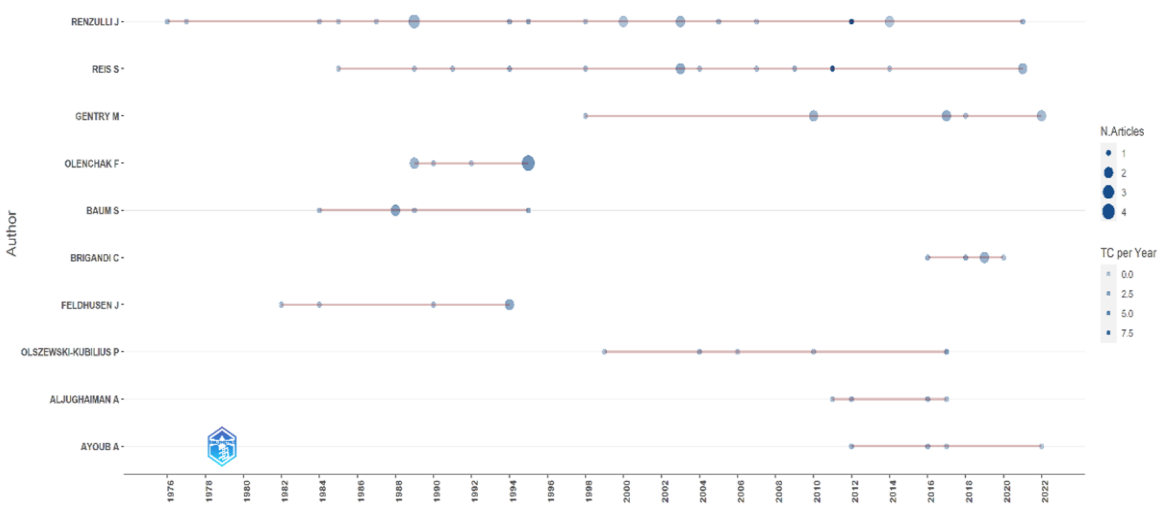

Figure 5. Authors' production over time

As seen in Figure 5, the continuity of these researchers in this field is also noteworthy. It is seen that Renzulli has been working on this issue since 1976, Reis since 1984 and Gentry since 1998, albeit with different frequencies. Other authors seem to be interested in this subject in different time intervals.

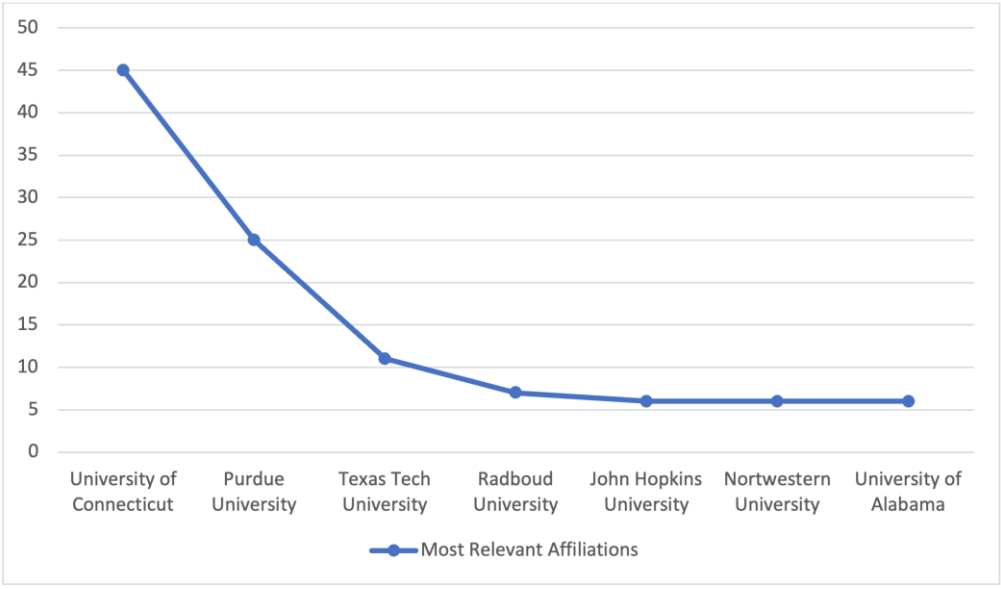

Figure 6. The relevant affiliations

When the distribution of the studies in the field of enrichment is examined by university (See Figure 6), the top three universities are University of Connecticut (n = 45), Purdue University (n = 25), and Texas Tech University (n = 11).

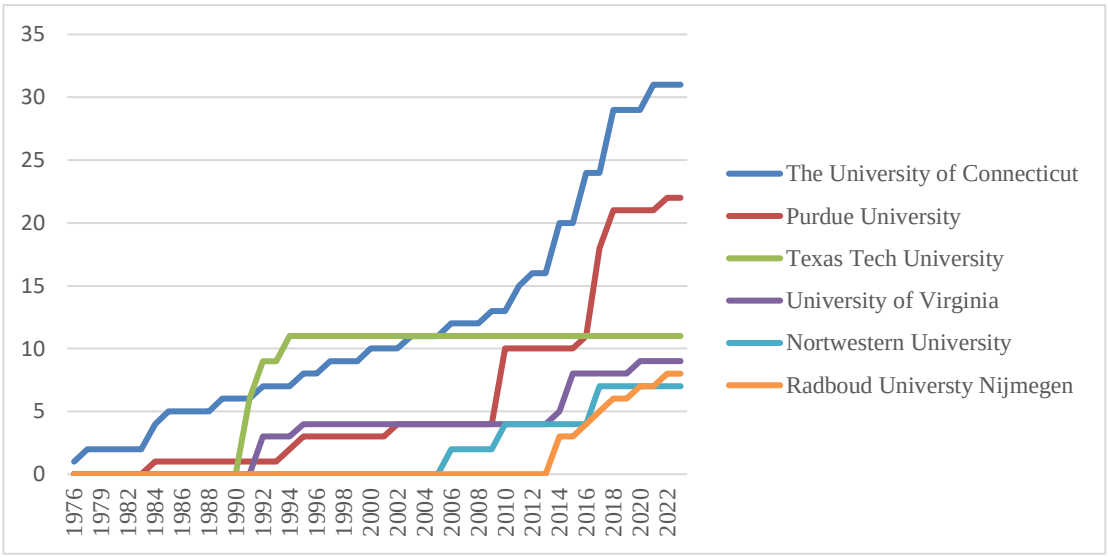

Figure 7. Academic contribution of institutions over the years

When investigating the academic contribution of institutions over the years (See Figure 7), it is seen that the University of Connecticut contributes continuously and with an increasing profile, Purdue University has the same profile even though there are certain stagnation years, West Virginia University, Texas Tech University and Radboud University contribute positively with an increasing graph from 2012. Northwestern University also has an increasing graph with periods of stagnation.

When we look at the countries of the authors contributing to this field demonstrated in Figure 8, it is seen that the USA (*n* = 242) is in the lead, with Germany (*n* = 18), Israel (*n* = 11), Turkiye (n = 13), the United Kingdom (*n* = 12), Suudi Arabia (*n* = 11), and China (*n* = 10). Looking at the graph outside the table, it is seen that Canada (*n* = 9), Netherlands (*n* = 8), and Australia (*n* = 7) follow these countries.

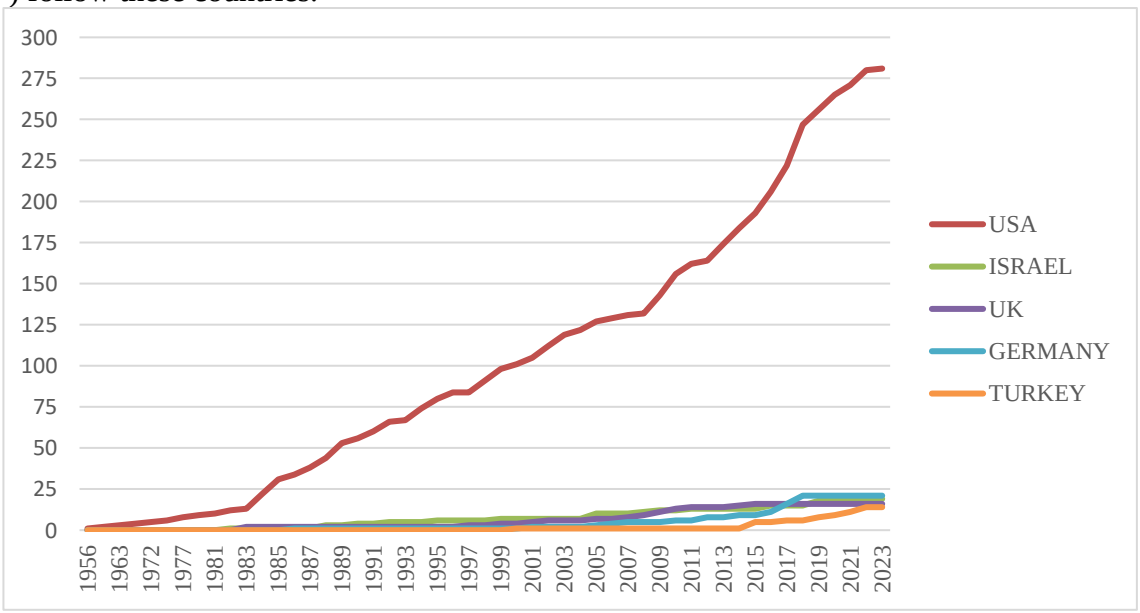

Figure 8. Countries' production over time

When examining the contribution of countries to the field over the years, it can be seen that the

United States has been increasing since the 1970s, while other countries have seen an increase in their graphs since the mid-1980s, although not as fast as the United States. It can also be stated that Israel, Türkiye, and Germany have started to work more in this field and have shown a significant increase in the number of studies.

Table 4. Most cited publications

	Authors	Publication Name	Total citations
1	Stevens & Slavin, 1995	The Cooperative Elementary School: Effects on Students' Achievement, Attitudes, and Social Relations	147
2	Renzulli, 2012	Reexamining the role of gifted education and talent development for the 21st century: A four-part theoretical approach	112
3	Reis et al., 2011	The effects of differentiated instruction and enrichment pedagogy on reading achievement in five elementary schools	110
4	Stake & Nickens, 2005	Adolescent Girls' and Boys' Science Peer Relationships and Perceptions of the Possible Self as Scientist	69
5	VanTassel-Baska & Brown, 2007	Toward Best Practice: An Analysis of the Efficacy of Curriculum Models in Gifted Education	67
6	Baum & Owen, 1988	High ability/learning disabled students: How are they different?	63
7	Baum et al., 1995	Reversing underachievement: Creative productivity as a systematic intervention	62
8	Stake & Mares, 2005	Evaluating the impact of science-enrichment programs on adolescents' science motivation and confidence: The splashdown effect	54
9	Tieso, 2003	Ability grouping is not just tracking anymore	52
10	Hebert, 1993	Reflections at graduation: The long-term impact of elementary school experiences in creative productivity	52

The top 10 most cited publications are listed in Table 4 above. It is seen that these were published between 1988 and 2012. Most of them include two or more authors, except the study made by Hébert (1993), Tieso (2003), and (Renzulli, 2012). Experimental studies seem to receive many citations.

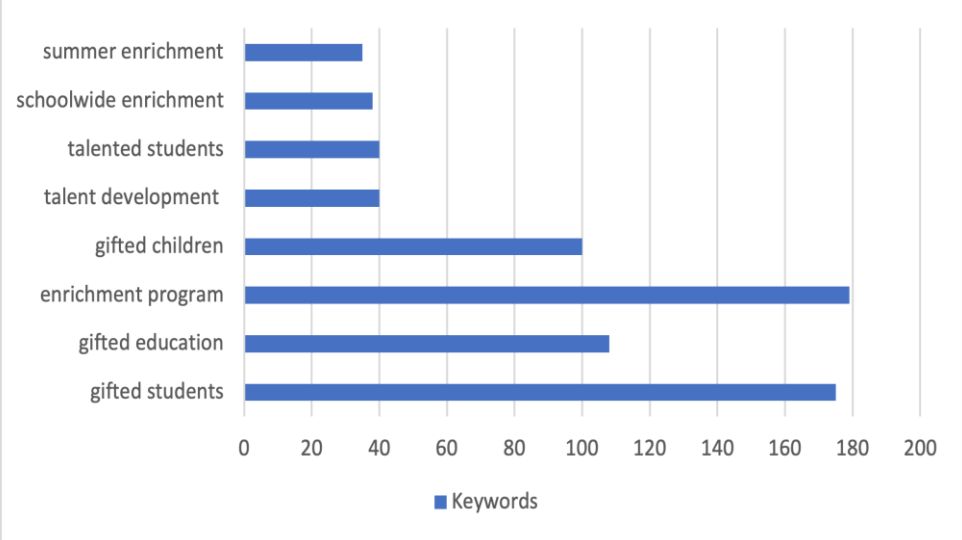

Figure 9. Most common keywords used in the publications

When Figure 9 is examined, the most common keyword in the abstracts is "gifted students" (*n* = 175), "enrichment program" (*n* = 179), "gifted children" (*n* = 100), "talent development" (*n* = 40), "talented students" (*n* = 40), "schoolwide enrichment" (*n* = 38), and "summer enrichment" (*n* = 35).

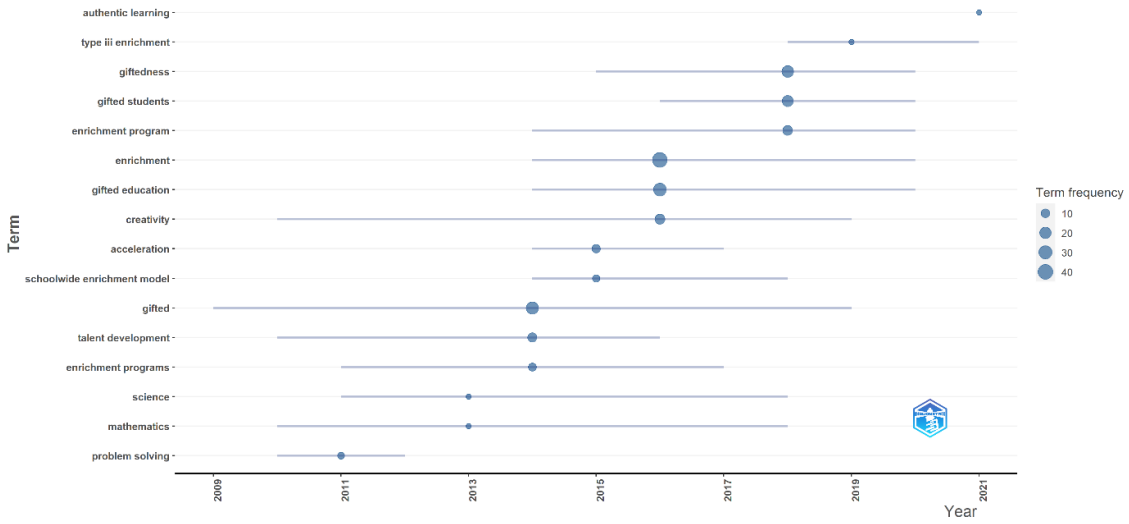

Figure 10. Trending topics in the field

When the trending topics are analysed, it is seen that between 2009 and 2013, science (*n* = 10), mathematics (*n* = 10), and problem solving (*n* = 20) were the main topics; between 2013 and 2016, acceleration (*n* = 20) and schoolwide enrichment (*n* = 20) were the main topics; between 2016 and 2019, creativity (*n* = 20) and enrichment (*n* = 40) were the main topics; and from 2019 to the present, authentic learning (*n* = 10) and type 3 enrichment (*n* = 10)were the main topics.

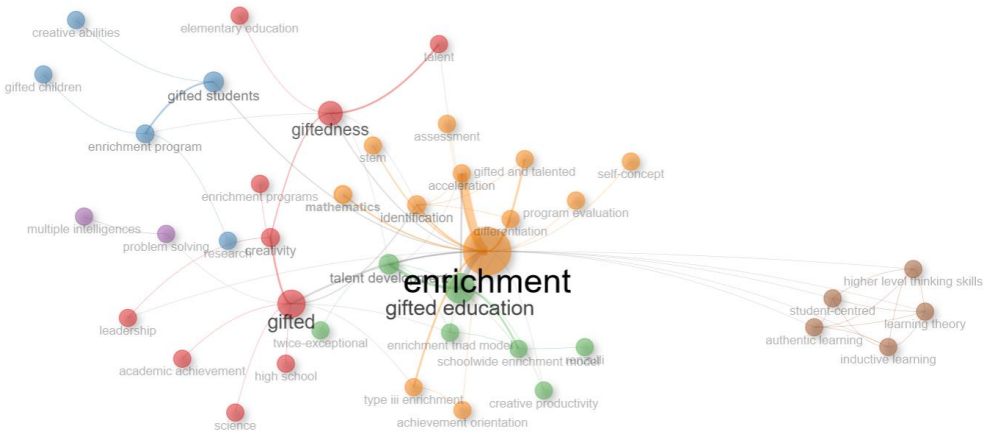

Figure 11. The co-occurrence network among topics

When the co-occurrence network is examined (See Figure 11), identification, differentiation, curriculum evaluation and self-concept are closely linked around the topic of enrichment, while higher order thinking skills, authentic learning and inductive learning are distantly linked. It is seen that there is a close relationship between the gifted education topic and the topics of talent development, enrichment triad model, schoolwide enrichment model and creative productivity.

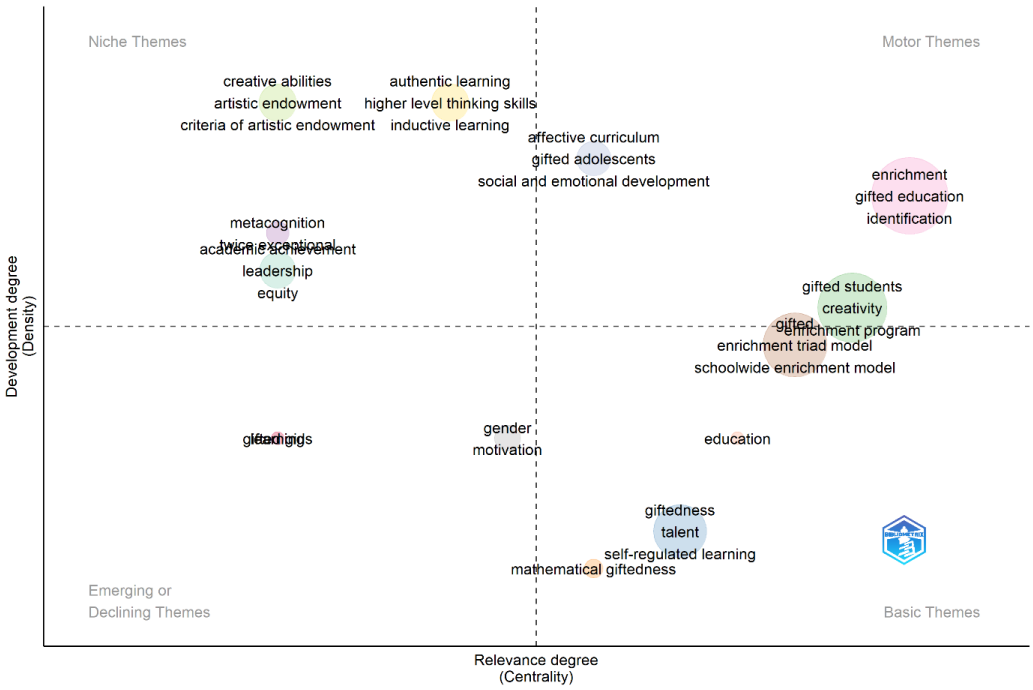

Figure 12. Thematic Map

When we examine the thematic map (See Figure 12), the themes of thinking skills (authentic learning, inductive learning), learning skills, metacognition, twice-exceptional, and equity stand out as niche themes; enrichment, enrichment programs, affective curriculum, social and emotional development, giftedness, identification, and gifted adolescents stand out as motor themes. Emerging themes were gender, motivation, and gifted girls, while mathematical giftedness, enrichment program, talent, schoolwide enrichment model, and enrichment triad model emerged as main themes.

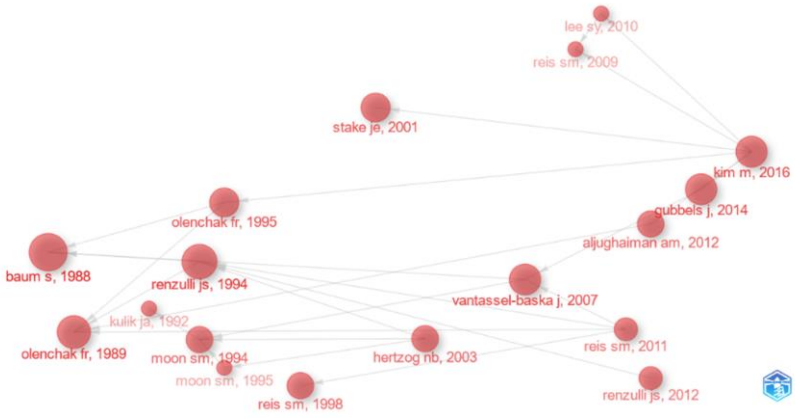

Figure 13. Histography of intellectual structure

When we examine the historiography of the intellectual structure, we see that new topics and new authors have contributed to the thematic development of enrichment over a period of about ten years, and that other authors, referring to the authors who initiated these topics, have also connected and integrated new and old themes. It should also be noted that the main themes are in a historical pattern between Baum, Renzulli and VanTassel-Baska.

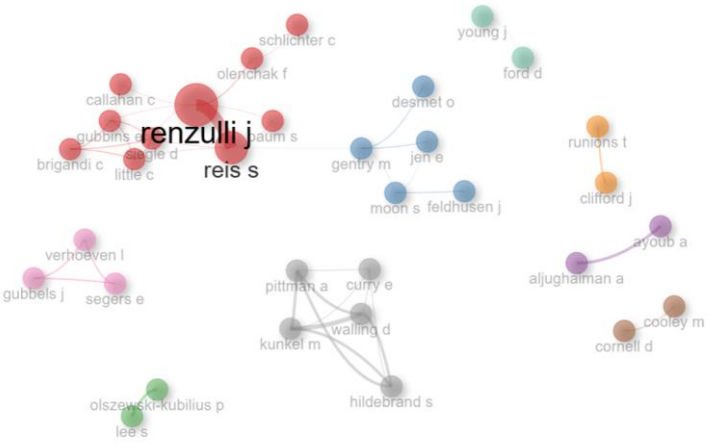

Figure 14. The cooperation between authors

When we look at the cooperation between the authors (See Figure 14), we see that there are too many independent groups. There is only a slight level of cooperation between the red and the blue group, the rest of the groups are not connected to each other in terms of collaboration, and they are not connected to the main group as we mentioned before.

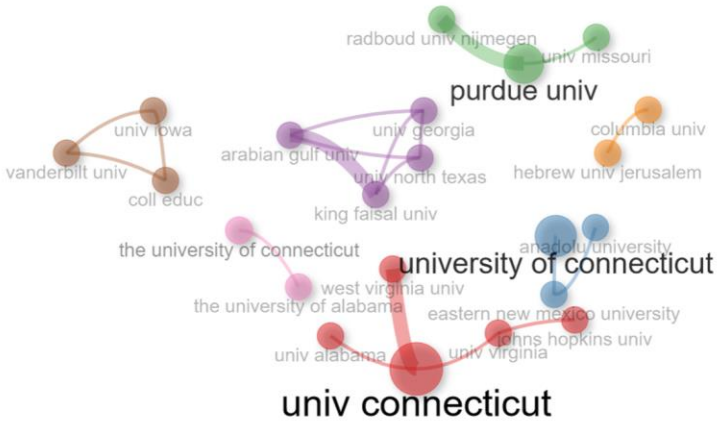

Figure 15. The Collaboration network between institutions

In connection with Figure 15, naturally, there are no strong collaborations between institutions. It is seen that there is more cooperation among universities in the USA. Universities of Connecticut and Purdue play the leading roles in this cooperation.

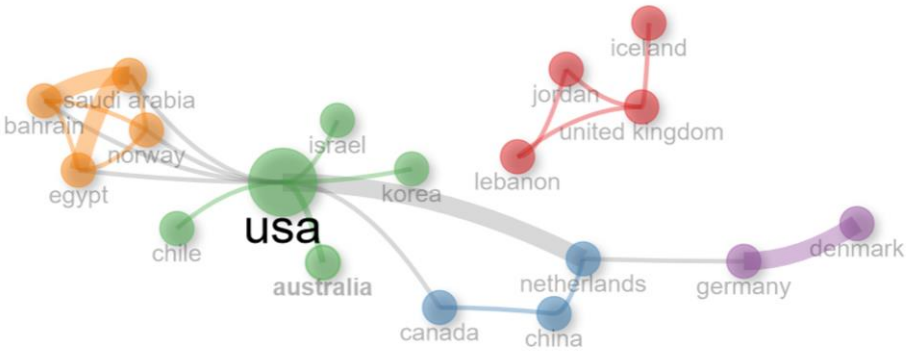

Figure 16. The collaboration network over countries

When cooperation between countries is examined (See Figure 16), there is a collaboration between the USA and Korea, Chile, the Netherlands, Australia, and Norway; between Bahrain, Norway, Egypt and Saudi Arabia; it is seen that there is a cooperation between Jordan, Lebanon and the United Kingdom, and between Germany and the Netherlands.

Discussion and Conclusion

Scholars used various methods to produce knowledge about enrichment pedagogy and its effects on the provision of gifted students. As a program and curriculum differentiation strategy, enrichment plays a crucial role in gifted education (VanTassel-Baska, 1988). Given this importance, this study explored the studies related to enrichment through BA to delineate a broad picture of what is going on in the field. When all the studies on enrichment in gifted education are examined up to the present day, the first study in this area was conducted in 1956, but from then until 1980, these studies were not conducted frequently, with only one or two studies conducted occasionally. However, since then, there has been a significant increase in the number of studies conducted, with an average of around 10 studies per year until the 2000s. While there were some years where fewer studies were conducted, such as in 2006, 2013, and 2014, there has been a noticeable increase in studies in the last decade. The reasons for this can be shown as the emergence of different enrichment programs and the increase in experimental studies conducted on intelligence and gifted education.

When looking at which journals the studies in this field were published in over the years and which journals showed more interest in these studies, it can be seen that the following four journals led the way: Gifted Education International, Roeper Review, Gifted Child Quarterly, and Journal for the Education of Gifted. It can also be seen in other bibliometric studies that these journals are the ones that contribute the most to the field of gifted education (Luor et al., 2022; Şakar & Baloğlu, 2022).

The most relevant authors in this field are Joseph Renzulli, Sally M. Reis and Marcia Gentry. Renzulli and Reis's prominence stems from his focus on 'the triad enrichment model' (1977), 'the schoolwide enrichment model' (1985, 1997), and 'the enrichment triad/revolving door model' (1986), and the educational and theoretical implications of all these studies. Renzulli and Reis collaborated for a long time and still do, both theoretically enriching these models and experimentally looking at their impacts up to now. However, Gentry also focuses on 'enrichment clusters' (1995, 2007), 'out of school enrichment programs' (2010, 2017), and 'summer enrichment programs' (2017) and emphasizes their pedagogical, affective, and cognitive effects. The Figure 6 in the findings section also shows that they are still interested, determined, and continue to work in this field. In parallel, when we look at which institutions have contributed the most to this field, we naturally see that the University of Connecticut, where Renzulli and Reis work, and Purdue University, where Gentry continues his work, lead the way. Again, naturally, when we look at the contribution of institutions to this field over the years, it is seen that the same universities are the pioneers.

When the contribution of countries to this field is analysed, it is seen that the United States focuses a lot on enrichment, while European countries, except Germany, Türkiye, and the Netherlands, do not focus much on this issue. The reason for America's focus on early studies on clinical psychology and special education led to the emergence of pioneer studies and researchers in the field. The reason for European countries' lack of focus may be the prevalent egalitarian approach according to which every student is gifted/talented and regular schools can meet the needs. In other words, while the US's approach is criticized as elitist, there have been

an overwhelming number of studies. The reason why Asian and Far Eastern countries are not present may be because of the indexes we scanned. For example, the fact that Russia and China focus on their own indexes makes it difficult for researchers to follow their studies.

When analysing the most frequently cited articles, a noteworthy finding is that experimental studies are cited more often than theoretical studies. It can be said that researchers are more interested in the effects of the proposed enrichment models and programs. The fact that the most commonly used keywords are gifted students, enrichment programs, and talent development also supports this finding. It is concluded that in these experimental studies, the effects of schoolwide enrichment and summer enrichment programs were mostly examined and there were fewer experimental studies on the effects of, for example, models based on Sternberg's (2005a) Triachic Model, Gagné's (2004) DMGT.

When the trending topic and the co-occurrence network are examined carefully, it is seen that the close branches around the main theme of enrichment are mostly on creativity, achievement, identification, and talent development. This may be due to the fact that Renzulli focused on these areas in the three-ring conceptions theory and looked at the effect of this model on these three concepts in his experimental studies (Olenchak & Renzulli, 1989; Reis et al., 2011). Likewise, when we look at the distant branches, topics such as authentic learning, higher-order thinking skills, STEM, and twice-exceptional standout. The thematic map in the findings section also supports this conclusion. This figure shows that creativity, identification, social-emotional development, and affective curriculum are the motor themes related to enrichment in relation to the three-ring conception of giftedness. The statement means that there is a lack of emphasis on the impact of enrichment models on higher-order thinking skills such as problem-solving, critical thinking, and computational thinking. Additionally, it is not highlighted whether these models can be adapted for different students. The statement also suggests that there are not enough studies that focus on the effects of these models on the skills of gifted students, such as their values, attitudes, motivation, collaboration, communication, self-concept, self-regulation, and wisdom.

When the social network analysis of the studies conducted in this field is examined, it is observed that there are no strong and mutually beneficial collaborations between the authors, institutions, and countries, in parallel with all the data and findings mentioned above. Although the weakness of this collaboration may appear as a critical situation, it should also be taken into account that the socio-demographic and cultural structures of each country are different, and that the models should be organized and applied according to these patterns.

Consequently, it can be asserted that studies in the field of enrichment have continued to increase since 1956, although there have been some years of decline and pause. Different researchers, journals, countries, and institutions have shown interest in this field and have conducted both theoretical and experimental studies. While the studies are generally focused on certain cognitive and emotional skills and a common enrichment model, it can be inferred that researchers also propose different models and focus on skills that are not emphasized much.

One of the constraints inherent in the present study pertains to the data source, which is confined to Scopus and WOS databases. Additionally, this investigation is limited by its exclusion of prior theses and dissertations. Moreover, this study solely encompasses research conducted in the English language. Hence, it is recommended that future studies account for these limitations to advance the state of knowledge in this field.

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