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EXAMINING THE STUDIES ON SCIENCE EDUCATION IN GIFTED/TALENTED INDIVIDUALS IN THE LAST 5 YEARS

Sıla BALIM
Research Assistant Dr., Dokuz Eylül University
Buca Faculty of Education, Department of Special Education, Buca-İzmir
ORCID: https://orcid.org/0000-0002-8140-268X
sila.balim@deu.edu.tr

Ece ALTAY
PhD Student, Dokuz Eylül University
Institute of Educational Sciences, Department of Science Education, Buca-İzmir
ORCID: https://orcid.org/0000-0003-0234-0044
ecealtay.8@gmail.com

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Abstract

Modern times are characterized by a daily rate of new scientific and technological advances. People who can stay up to date with developing advancements and even incorporate them into daily life are needed. This will only work if the appropriate groups and instructional strategies are used. Gifted and exceptionally talented individuals hold a significant position in society and are vital groups in special education because they frequently require customized instruction. By emphasizing the relationship between science education and special education and considering the methodologies, data collection tools, findings, and other noteworthy aspects of recent research in the field, the current study seeks to evaluate the importance of integrating these two domains. This study was carried out as a review of the literature. In this context, 45 articles with the keywords "Gifted/Special Talent", "Science", "Gifted/Talented Students", and "Science" in the literature between January 2019 and May 2024 were examined within the scope of the study. During the selection of the studies, current databases such as Google Scholar, Dergipark, Core, DOAJ, and Web of Science were used. While examining the studies, the "Article Review Form" created by the researchers was used. As a result of the examinations, it was determined that there were more Turkish publications and that there was an equal tendency in terms of the method used. While the scanning and phenomenology research design was preferred more, t-test and content analysis were mostly used as data analysis methods. Depending on the method, it was determined that scales and interviews were preferred as data collection tools. It was determined that a small sample size was tried to be preferred in sample selection, and in addition, studies were conducted for various purposes and results were obtained.

Keywords: Gifted individuals, science education, special education, document review.

INTRODUCTION

Today, education systems are developing various approaches to support student profiles that develop in different directions, and especially gifted individuals. Considering the significance of gifted individuals for societies, science education is becoming increasingly important in the education of these individuals. Special education is a customized educational approach designed to meet the special needs of students and maximize their potential (Genç, 2016). Otherwise, science education has an important place in special education as it is a discipline that aims to develop scientific thinking, problem-solving, and discovery skills (MEB, 2018).

The relationship between special education and science education is important in terms of discovering, developing and directing the scientific abilities of gifted or superior students. While science education is one of the areas where gifted/specially talented students are most successful, science education programs developed for them can also provide an ideal ground for revealing their potential (VanTassel-Baska, 2021). Applications aimed at gifted/specially talented individuals can

meet the individual needs of these students and enable them to achieve greater success in science education (Camcı Erdoğan, 2014). This article focuses on the relationship between special education and science education, emphasizing the role of gifted or specially talented individuals in science education. In addition, the findings and suggestions of existing research in this field are also discussed, and an in-depth evaluation is aimed at presenting the importance of the integration of special education and science education.

One of the biggest goals of today's education system is to ensure that each student receives an education that is appropriate for their unique needs and abilities. In this context, the relationship between fields such as special education and science education is becoming increasingly important. Special education is a discipline that aims to adapt teaching strategies and methods in cases where students exhibit differences in their learning processes. Moreover, the aim of science education is to assist students get an effective understanding of nature and the environment as well as to help them develop scientific thinking abilities. The relationship between science education and special education for gifted and talented students will be discussed in this article, along with the implications for the future of the educational system. In particular, we will focus on how this relationship creates synergy and how it encourages students' scientific curiosity. This analysis will help educators and policymakers understand what strategies they can follow to maximize the potential of each student (Hançer, Şensoy, & Yıldırım, 2003). Importance of the study, approaching the studies on science education of gifted/specially talented students from a holistic perspective and contributing to researchers who want to work in this field and who have been working in recent years. In addition, this research can provide information about which areas are highlighted in science education of gifted/specially talented students and how much importance is given to which topics. The purpose of this study is to examine the relationship between science education and gifted/specially talented kids, with a particular emphasis on the function that science education plays in the education of these individuals. In addition, it is planned to present an in-depth evaluation of the importance of the integration of science education of gifted/specially talented students by considering the purpose, method, findings, and results of existing research in this field. This study aims to provide a general perspective on the article studies on science education of gifted/specially talented students. The study aims to examine the articles in the literature on science education of gifted/specially talented students in terms of various variables and present them comparatively. Accordingly, the questions that follow are being made in order to get an answer:

Article studies on science education of gifted/talented students in local and foreign literature,

1. How is the distribution by year?
2. How is the distribution of studies by publication language?
3. How is the distribution by research methods?
4. How is the distribution by research designs?
5. How is the distribution by data analysis methods?
6. How is the distribution by data collection tools?
7. How is the distribution by sample group?
8. How is the distribution by results of studies?
9. How is the distribution by purposes of studies?

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METHOD

The document review strategy, one of the qualitative research methodologies, was employed since the fundamental questions the study attempts to answer are predicated on the interpretation of qualitative data discovered by looking through the papers (Bowen, 2009). The study highlights the connection between science education and special education. It also discusses the methodology, data collection methods, key findings, and other pertinent aspects of recent research in the field. Finally, an assessment of the significance of gifted and talented students and the integration of science education is given. The data were included in the evaluation's scope, and the document review methodology was chosen.

Data Collection and Analysis Process

Selecting target documents: While conducting the analyses, 45 articles with the keywords ***"Gifted/Specially Talented", "Science", "Gifted/Talented Students", "Science" between January 2019 and May 2024*** were examined within the aim of the research. In the stages of selecting target documents, Google Scholar, Dergipark, Core, DOAJ, Web of Science databases were first used. Later, as a result of the initial reviews, 47 articles were included in the review according to the keywords and selection criteria, while as a result of detailed reviews, two articles were excluded from the review due to the fact that they did not meet the review criteria by the experts and went beyond the purpose of the study, and 45 articles were included in the review.

Developing categories: The researchers' "Article Review Form" was the tool used to evaluate the studies. You may find the paper review form in Appendix 1. The study's data were divided into categories based on the following: the study's year, publishing language, methodology, pattern, data collection instruments, data analysis techniques, sample size, findings, and goals. The researcher established new categories and reviewed studies that were based on the document analysis method in order to determine these categories.

Determining the unit of analysis: In selecting the studies, consideration was given to the terms "Science," "Gifted/Talented Students," and "Gifted/Specially Talented" in relation to the sample group.

Digitalization: The articles in the literature on the teaching of science to gifted/specially talented students were digitized and their frequency and percentage estimates were done.

RESULTS

This part presents and interprets the results in tabular form as percentages and frequencies based on the study questions.

The first question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature by year?" The findings regarding the distribution of articles by year according to the document analysis are shown in Table 1 and Figure 1.

Table 1. Studies frequency by year.

Year	F	%
2020	14	31,12
2021	13	28,88
2022	6	13,33
2023	11	24,44
2024	1	2,23
Total	45	100

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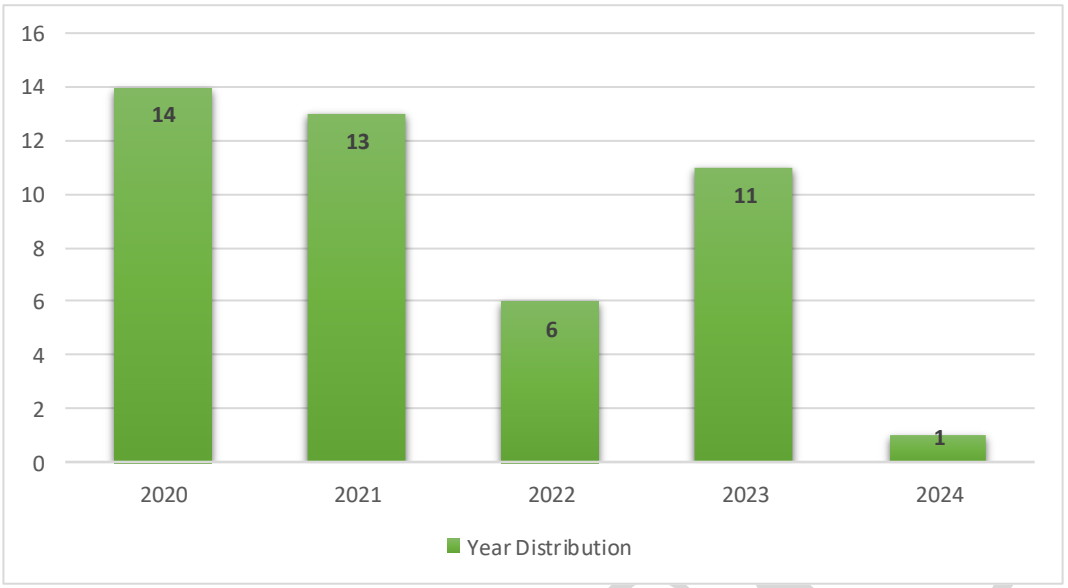

Figure 1. Distribution of studies by year.

Looking at Table 1 and Figure 1, we can see that the most studies in this field were done in 2020, with a rate of 31.12%. This is the most in the last 5 years. This rate is followed by 2021 with 28.88%, 2023 with 24.44%, 2022 with 13.33% and 2024 with 2.23%. Although there is a study in 2024, the most important part here is that the 2024 data covers the studies up to May. Put simply, this data is derived from the study conducted over a period of 5 months.

The second question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to the language of publication?" The findings regarding the distribution of articles according to the language of publication according to the document analysis are shown in Figure 2.

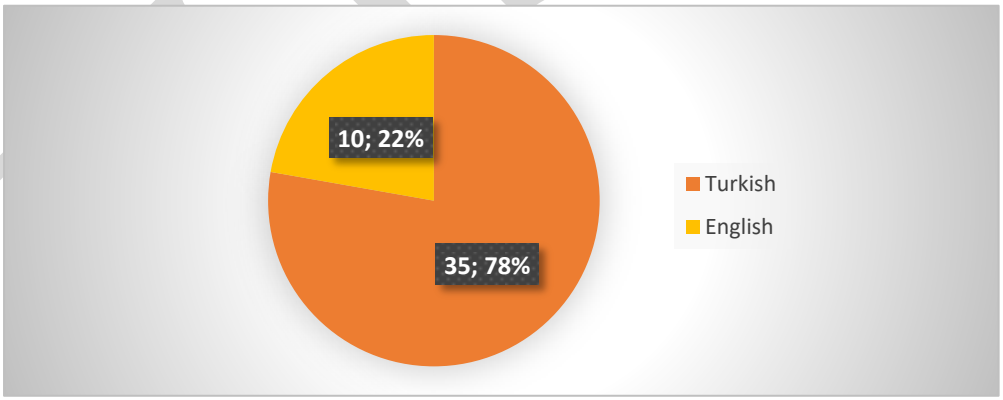

Figure 2. Distribution of studies according to publication language

When Figure 2 is examined, the publication language of 35 (78%) of the 45 articles in this field is Turkish, while the publication language of 10 studies (22%) is English.

"What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to research methods?" was the response given to the third research question. Figure 3 displays the results of document analysis regarding the distribution of articles based on chosen research methods.

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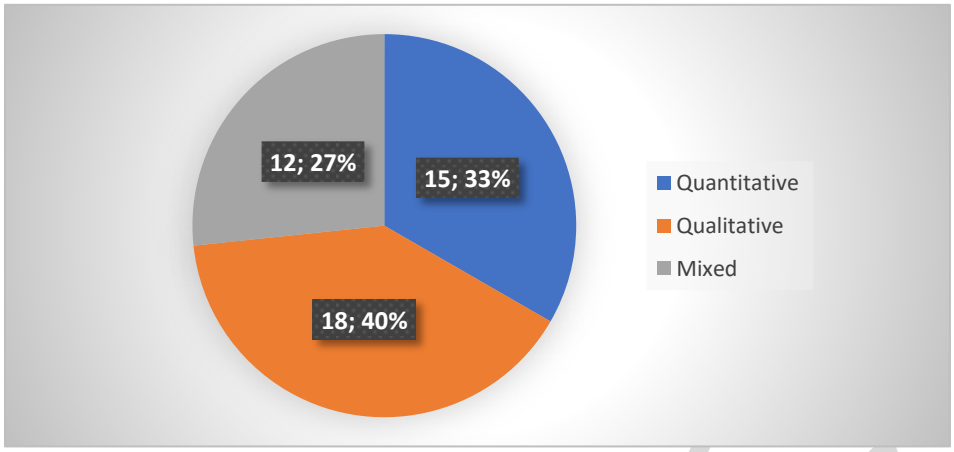

Figure 3. Distribution of studies by research method

When the distribution of methods used within the scope of the studies is examined in Figure 3, it was determined that Qualitative method was preferred at 40%, Quantitative method at 33% and Mixed research methods at 27%.

The fourth question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to research designs?" The findings regarding the distribution of articles according to research designs preferred according to the document analysis are shown in Table 2.

Table 2. Distribution of studies according to research design.

Research Method	Research Design	F
Quantitative	Screening Model	8
	Experimental Design	5
	Action Research	1
	Survey Design	1
Qualitative	Phenomenology	7
	Case Study	5
	Content Analysis	2
	Compilation	1
	Document Review	1
	Systematic Functional Multimodal Discourse Analysis	1
	Unspecified	1
Mixed	Sequential Explanatory Design	3
	Embodied Experimental Design	2
	Action Research	1
	Nested Mixed Design	1
	Parallel Mixed Design	1
	Concurrent Embedded Research	1
	Unspecified	3

The studies' research designs are examined in Table 2. The exams revealed that several designs were employed, but generally speaking, the research design used for the study's scope was not mentioned in the technique section of four studies. When the designs used within the scope of the selected methods are examined in detail, the study designs are explained in order of use. In the quantitative research

method, scanning model, experimental design, action research and survey design were preferred. In the qualitative research method, phenomenology, case study, content analysis, compilation, document review and systematic functional multimodal discourse analysis designs were used. In mixed research methods, sequential explanatory design, embedded experimental design, action research, nested mixed design, parallel mixed design and simultaneous embedded research designs were preferred.
The fifth question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to data analysis methods?" The findings regarding the distribution of articles according to the data analysis methods preferred according to the document analysis are shown in Table 3.

Table 3. Distribution of studies according to data analysis methods.

Data Analysis Methods	F
T-Test	16
ANOVA	9
Mann Whitney U	2
Kruskal Wallis	2
Wilcoxon Signed Rank Test	5
Content Analysis	18
Descriptive Analysis	3
Deductive Analysis	2
Coding/Category/Theme	4
Matrix	1
Inductive	1
Data Analysis For Phenomenological Studies	1
Pre-Test-Post-Test Analysis	1
Eye Movement Study Analysis	1
Sf-Mda Approach Analysis	1
Unspecified	1

The description of methods used to analyze the data collected throughout the investigations is displayed in Table 3. It was found that the most often employed tests were the t-test and content analysis. In addition to this, it was found that various data analysis techniques were favored based on the data and the data collection instruments used in the investigations.

"What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to data collection tools?" was the sixth study question that was examined. Table 4 displays the results of the document analysis on the distribution of articles based on the desired data collecting tools.

Table 4. Distribution of studies according to data collection tools.

Data Collection Tools	F
Scale	16
Semi-Structured Interview	14
Test	9
Observation	5
Form	5
Survey	4
Document	4
Inventory	4
Other	4

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Table 5 (Continued). Distribution of studies according to data collection tools.

Data Collection Tools	F
Diary	3
Interview	2
Notebook/Drawing	2
List	1
Open-Ended Sentence Completion	1

Analysis of the distribution of data collection instruments used in the research reveals that certain studies employed multiple data collection instruments in Table 4. It was found that, overall, about fifteen different data collecting instruments were employed for the purposes of the research. It is apparent that semi-structured interviews and scales are the most often utilized data collection instruments. It was also found that several instruments for gathering data, including surveys, questionnaires, tests, observations, and papers, were employed.

The seventh question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to the sample group?" The findings regarding the distribution of preferred sample groups according to various categories in the articles conducted according to the document analysis are shown in Table 5 and Table 6.

Table 6. Distribution of studies according to sample density.

Sample Density	F
0-50 Individuals	23
51-100 Individuals	8
101-150 Individuals	5
151-200 Individuals	1
201 and above	4

The sample distributions for the experiments will be shown in Table 5 and Table 6. Upon examining Table 5, it becomes apparent that the research' ideal samples often consist of individuals aged 0-50. 45 articles were reviewed; 23 work with 0–50 samples, 8 with 51–100 samples, 5 with 101–150 samples, 4 with 201 and above samples, and 1 with 151-200 samples. Four investigations looked over the documents. These studies contain 17, 65, 72, and 79 documents, in that order.

Table 7. Distribution of studies according to sample diversity.

Sample Diversity	F
Student	36
Parent	2
Teachers	6
Teacher Candidate	2
Other (Staff)	1

Sample diversity is displayed in Table 6. It was found that the majority of the research involved students, and very few involved parents, instructors, teacher candidates, or other staff members. It was found that certain studies made use of a diverse sample.

"What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to their results?" was the eighth research question that needed to be answered. Table 7 displays the conclusions of the outcomes of the articles that were completed in accordance with the document analysis.

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Table 8. Results obtained from the studies.

Publication Code	Results
M1	According to the study's findings, eighth-graders scored the highest on attitude. Following a gender analysis, it was discovered that female students outperformed male students in terms of attitude.
M2	It was finding that brilliant and gifted children showed a strong interest in science courses. The level of fatherhood was shown to significantly differ based on the gender variable.
M3	The study's findings revealed that engaging in extracurricular STEM activities considerably improved the entrepreneurial abilities and attitudes of gifted and exceptionally gifted adolescents toward STEM.
M4	The study's findings demonstrated that the participants' understanding of gifted and talented students was lacking.
M5	With the use of the data collecting tool, gifted students generated 34 different metaphorical perceptions for the concept of "science," 37 for the concept of "scientist," 38 for the concept of "science teacher," and 48 for the concept of science itself.
M6	Based on the collected data, it was concluded that biology-related courses were the most straightforward for the students, while physics-related subjects presented the most challenge. Furthermore, research has shown that students prefer hands-on activities and the use of visually appealing materials when learning and teaching.
M7	The results have been separated into positive and negative categories, and the teacher's essential module and process-related points were noted in each category. Additionally, recommendations were made for potential future uses of these kinds of resources.
M8	The results showed that a significant number of teacher candidates said the trainings aided in their professional and personal development.
M9	The study's findings demonstrated that gifted children had a significant difference in scientific literacy, with modest average scores for the SL, NS, and STS sub-dimensions for both groups.
M10	The study's findings demonstrated that LARO classes were effective in assisting students in learning the foundations of the scientific method.
M11	According to the study's findings, science teachers can teach science students in elementary school science classes scientific and engineering methods as well as water literacy by utilizing the experiential learning framework.
M12	It was observed that the students came up with 78 distinct answer phrases pertaining to the idea of a scientist, and that they most frequently connected the terms "smart" and "patient" with the concept of a scientist.
M13	This compilation study suggests that the STEAM integrated learning paradigm supports students' ability to think creatively by fostering complex mental connections between disciplines. These individuals are gifted and intelligent.
M14	The study's conclusions indicate that limited numbers of students were included in the samples and that qualitative methods were generally preferred in postgraduate research on scientific education for gifted children. It is clear that teacher perspectives and STEM education applications are the most often explored study themes in master's theses.
M15	When studies on talented children in science education were examined in Turkey between 2018 and 2021, a majority of the studies concentrated on STEM, environmental education, problem-based learning, project-based learning, and the creation and assessment of modules and activities. The results of the sample/study group of research indicate that most secondary school students are investigated. Most of the publications that were released claimed to have enhanced skill development.
M16	It has been found that STEM education strengthened students' professional ideas, STEM applications had a good impact, and STEM applications helped students learn more about the career they intended to pursue.
M17	The findings showed improvements in the motivation, self-assurance, and attitudes of students for science classes in the classroom.

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Table 9 (Continued). Results obtained from the studies.

Publication Code	Results
M18	According to the study's findings, there has been an apparent increase in interest in STEM education among gifted educators, especially in the discipline of science. The number of papers that have been published has increased in accordance with this.
M19	The study's findings showed that seventh-graders' attitude scores were somewhat higher than those of fifth- and sixth-graders on average. After a gender analysis, it was shown that female students scored better on attitude than male students.
M20	The scientific epistemological views of talented students who study science more often have improved.
M21	The study found that gifted students conceptualize science as information derived from experience, life, and science. It was determined that gifted students wanted to use desire to use projects, observations, fieldwork, and experiments to understand science.
M22	The astronomical learning outcomes and excitement of the experimental group pupils were enhanced by AR-supported astronomy instructional activities. The technological, cognitive, and emotive elements of augmented reality applications received positive feedback from talented students as well.
M23	The findings demonstrate that coding instruction enhances students capacity for analytical thought.
M24	The research group's post-test results on the scientific creativity scale show a substantial difference from the pre-test results. After analyzing the impact of the STEM-based activity on cognitive achievement, it was found that there were notable differences in gifted/talented students.
M25	The study's conclusions showed that the gifted students who participated in the research were able to use the LEGO® Education® BricQ Motion Essential Set to brush up on their knowledge and skills for the twenty-first century and that they also developed positive perceptions of the educational set.
M26	The study finding show them, it was found that the talented kids' STEM capabilities, attitudes toward STEM, and problem-solving abilities were significantly enhanced by STEM applications.
M27	Based on the findings, differentiated science education applications were found to enhance pre-service teachers' beliefs about the efficacy of science teaching, as well as their competencies in learning science, academic self-efficacy, and beliefs about engaging in science-related activities outside of the classroom.
M28	It was shown that talented students outperformed non-gifted students in creative problem-solving abilities due to differences in thinking, general knowledge and skills, and general average. The average scores for the gifted students' environmental sub-dimension and overall scores showed a substantial difference in favor of the girls.
M29	Upon examining talented students' ideas regarding energy and energy sources, it becomes evident that there are conceptual and meaning gaps and inaccuracies in their mental models.
M30	The result was to the observation that male students are more motivated to study STEM than female pupils. It was shown that gifted pupils are more motivated to study STEM subjects than students in religiously affiliated schools. The findings also showed a direct correlation between parents' educational attainment and STEM enthusiasm.
M31	The study's findings showed that students' proficiency in scientific processes had significantly increased; however, these gains were mostly concentrated in the basic and causal SPS, with little progress seen in experimental processes.
M32	The results demonstrated that both gifted and non-gifted students possessed strong science self-regulation abilities.
M33	The study finding showed students' conceptual knowledge and scientific process skills rose significantly in both groups. It was determined that students in the virtual laboratory who were gifted outperformed those in the physical applied laboratory.
M34	The study's findings demonstrated that, in addition to conducting process observations, teachers considered students' cognitive, affective, and social characteristics when identifying them as gifted.

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Table 10 (Continued). Results obtained from the studies.

Publication Code	Results
M35	The SS-US and SS-US-UN versions were the most popular ones for the study finding. In this level-level interaction, the unseen levels were crucial in making meaning of the occurrences, while the SS level was crucial in providing an explanation by concentrating on certain phenomena. Students were able to explain scientific topics like what happened and why with causal explanations, especially when all three levels formed a meaningful relationship.
M36	The comparison analysis revealed that students placed greater value on doing and trying, parents placed more value on learning-related features, and teachers placed more value on thinking-related aspects. The findings demonstrated that "conducting experiments, asking questions, thinking logically to solve difficult problems, and sharing ideas" were all seen by the three groups as critical components of scientific creativity.
M37	The results showed that graph reading was difficult for physics students in all three groups.
M38	The study's findings indicate that the STEAM project activities balanced the creative expressions of science, art, and craft. There was a substantial emphasis on the development of cognitive skills, with an emphasis on knowledge, mental flexibility, associative thinking, and associative thinking.
M39	The findings demonstrated that multimodal representations in their most basic versions were taught by teachers. There were very few sophisticated multimodal representations.
M40	The study's qualitative and quantitative results demonstrated how gifted students' collaborative work and problem-solving abilities were enhanced by the problem-based differentiated science education module.
M41	Within the parameters of the study, it was found that talented students' creative thinking, problem-solving abilities, and attitudes were significantly impacted by the practices differentiated in accordance with the Grid Model.
M42	As a result of the transactions made, students' scientific inventiveness could grow because of the STEM-based educational design. It was discovered that during the procedure, the experimental group utilized more engineering abilities and scientific process skills than the control group, and they also shown more improvement.
M43	This research one primary gifted classroom to determine what norms were established and how they developed in the process of creating student-generated drawings. These findings indicate that, in order to facilitate student-generated drawings, educators must take into account at least two factors: how to assist students in developing and visualizing ideas as they work through the drawing process. The findings showed that in order for teaching techniques to be effective, students must be exposed to the fundamental concepts of each strategy through a variety of media, and students' actual behaviors that embody the concepts must also be observed.
M44	The gifted/talented students came up with 31 distinct metaphors for the idea of "BİLSEM" and 30 distinct metaphors for the idea of "School." However, based on the students' perceptions, it was determined that the settings at BİLSEM and the school did not constitute a whole; that is, BİLSEM was distinguished by its entirely positive metaphors, while the school was mentioned with both positive and negative metaphors.
M45	The results of the study, students thought that the realistic learning environment helped them recall the content better, and the local rural knowledge model increased their interest in STEM subjects.

In Table 7, each of the research findings is discussed individually. The collected data are listed below when the general examination of the study results is done. These;

- It's been found that educators, parents, and other caregivers don't know enough about gifted and talented kids.
- Based on the characteristics analyzed, pupils' attitude scores rise as their grade level rises.
- It has been determined that when gender is taken into account, female students have higher attitude ratings than male students.
- After receiving science instruction, talented children exhibit a positive shift in their views toward the epistemology of science.

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• Students benefit from instructional strategies that include technology.
• It has been found that talented kids' STEM skills, attitudes toward STEM, enthusiasm, creativity, and problem-solving abilities are significantly enhanced by STEM applications.

The ninth question of the research was answered by "What is the distribution of articles on science education of gifted/specially talented students in domestic and foreign literature according to their purposes?" The findings regarding the distribution of articles according to the purpose of the document analysis are shown in Table 8.

Table 11. Distribution of studies according to objectives.

Purpose	Special Purpose
Affective Domain	Attitude Towards Environmental Knowledge
	Interest Towards Science
	Attitudes Towards Stem
	Motivation Towards Science
	Stem Epistemological Belief
	Attitudes Towards Science
	Scientific Epistemological Belief
	Augmented Reality Attitude
	Belief On Differentiate Education
	Competence On Differentiate Education
	Stem Motivation
	Attitudes
Cognitive Domain	Entrepreneurship
	Status Of Bilsem Teachers Regarding Knowing Their Students
	Metaphors Detection Of Concepts
	View Of Science
	Application Evaluation
	Conceptual Perceptions Within The Scope Of The Module
	Scientific Literacy
	Effect Of Use Of Laro
	Scientific Process Skills
	Water Literacy
	Image And Characteristics Of Scientist
	Steam Creativity
	General Status Of Thesis, Article, Graduate Studies
	Stem Choice Of A Profession
	Status Of Studies Within The Scope Of Stem
	Success Of Augmented Reality Application
	Augmented Reality Application Opinion
	Coding Analytical Thinking
	Stem Scientific Creativity
	Stem Cognitive Achievement
	Lego Set 21st Century Skills
	Stem Problem Solving
	Lego Set Applications Opinion
	Mental Model
	Creative Problem Solving
	Science Self-Regulation Skills
	Laboratory (Real+Virtual) Conceptual Knowledge
	Creating Scientific Explanations
	Scientific Creativity
	Graph Reading
	Collaborative Working
	Associating Representations With Indicators
	Stem Effect
	Drawing/Creating
	Metaphors

In Table 8, the aims of the studies are examined by creating themes and categories. In this context, the aims of the studies are divided into two by experts as affective and cognitive areas, which are the areas they basically examine and seek answers to. Later, the aims of the studies are divided into themes and categorized according to two main areas. In general, it has been determined that the studies are carried out with very different aims, but they are shaped on areas such as STEM, technology-supported education, creativity, attitude, motivation, belief and competence. Furthermore, it has been ascertained that the research is conducted with several objectives, including water literacy, visual aid learning, and information clarification.

DISCUSSION, CONCLUSION, and SUGGESTIONS

The study's objective was to present an assessment of the value of integrating science and special education by highlighting the connections between the two subjects and by going over the methodology, data collection methods, conclusions, and other significant aspects of the amount of current research in the area. Within the parameters of the research, 45 publications containing the keywords "Gifted/Special Talent", "Science", "Gifted/Talented Students", and "Science" published between January 2019 and May 2024 were analyzed using the document review technique. Google Academic, Dergipark, Core, DOAJ, and Web of Science databases were employed in the study selection process. The researchers' "Article Review Form" was employed to analyze the studies. Following the studies, it was found that the number of Turkish publications was higher and that the approach utilized was generally equivalent. The t-test and content analysis were the most often utilized data analysis techniques, even though the scanning and phenomenology research designs were chosen. It was found that the best data gathering instruments were scales and interviews, depending on the methodology. Studies are carried out for a variety of reasons and outcomes are produced; it has been shown that a small sample size is preferable in sample selection.

Yalçınkaya (2023) searched for to offer an overview of postgraduate research on scientific education for gifted and talented carried out in Turkey. The study's findings indicate that postgraduate research on the science education of gifted and talented people has favored qualitative methodologies, and inevitably, only a small number of students have been included in the samples. The most often researched themes in master's theses are those that include revealing instructor viewpoints and STEM teaching practices. Following examination more closely, the results of this survey, which looks at the overall state of postgraduate and current studies, are comparable. Stated differently, research on the integration of gifted/specially talented education and science education is typically undertaken with students and at a low sample density in articles or postgraduate publications. These studies are qualitative in design. Furthermore, it is evident that STEM is given a lot of importance.

The students and a limited sample size are typically observed in research on the scientific education of gifted/specially talented the students. There aren't many studies that involve parents in the study. Small sample groups and student-based studies stand out when the current studies in the literature are evaluated (Güngören, Uyanık, Erdoğan, & Demirhan, 2016; Kırnık & Susam, 2018; Yalçınkaya, 2023). The limited enrollment at BİLSEMs and various issues with parental authorization might be the primary causes of this predicament. The chosen research approach is an additional important factor. Because the type of approach used determines the study strategy, data collecting instruments, and data analysis techniques. Research indicates that qualitative research techniques make up the majority of the methodology used in this sector (Kara, 2020; Özenç & Özenç, 2013; Yalçınkaya, 2023). This study demonstrates that the qualitative research approach is in this direction, and as a consequence, the pattern, data collecting instrument, and analysis are in line with the literature. It might be argued that the qualitative approach has gained prominence, particularly in recent research projects.

Suggestions

Based on the study's results, more in-depth research involving kids in this subject as well as parents, staff, teacher candidates, and other stakeholders is required. It's also advised to conduct the study using a variety of different data collection technologies. Last but not least, the study's findings have shown that there are gaps in the integration of bright and exceptionally talented people with science education. Currently, raising people's awareness and improving the quality of education are crucial. The study's data is intended to serve as a roadmap for future research projects and other scholars.

Ethics and Conflict of Interest

This study was presented as an oral presentation at the UBAK 4th National Scientific Research Congress. The authors declare that the work is written with due consideration of ethical standards. The authors declare that they have no competing interests.

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Appendix 1.

ARTICLE REVIEW FORM

ARTICLE NAME:	
YEAR:	
AUTHOR/S:	
PUBLICATION JOURNAL/LOCATION:	
PURPOSE OF THE STUDY:	
RESEARCH METHOD	( ) QUALITATIVE ( ) QUANTITATIVE ( ) MIXED ( ) UNSPECIFIED
RESEARCH DESIGN:	
DATA COLLECTION TOOLS:	
SAMPLE/STUDY GROUP:	
DATA ANALYSIS METHODS:	
RESULTS 1. 2. 3.	