JSSER
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Journal of Social Studies Education Research

Sosyal Bilgiler Eğitimi Araştırmaları Dergisi

2024:15 (4), 197-222

Global Insights in Giftedness Research: Mapping Current Characteristics and Challenges

Lorena Quintero-Gámez[1] & Jorge Sanabria-Z[2,3]

Abstract

Identifying gifted students in today's complex context requires precision in both the definition of the concept and its constituent characteristics. However, there are discrepancies worldwide in the instruments established to diagnose gifted students. This study undertook a systematic literature review (SLR) to identify the most representative characteristics of this profile. A database of 676 articles from Scopus and WoS was analyzed, of which 37 were screened for further study using a content analysis approach. The study aimed to answer two research questions: (1) What are the prevailing characteristics of research on giftedness? (2) What are the challenges and barriers to current research and practice in gifted research? These inquiries were addressed through a series of disaggregated questions divided into four categories: publication metrics, study methodology, identification and support of giftedeness, and technology used. The main findings were a) the lack of standardized measures for identifying gifted individuals; b) the important role of teacher training in identifying and supporting gifted profiles; and c) the inherent limitations of research on giftedness, which constrain the generalizability of its findings. It was concluded that emotional intelligence plays a critical role in giftedness. Key challenges identified include discrepancies in giftedness identification instruments and the impact of cultural and socio-economic factors on gifted education.

Keywords: *Educational innovation, giftedness, gifted characteristics, higher education.*

Introduction

The importance of an appropriate conceptualization of giftedness has been the focus of great interest in scientific communities over the past decades. The term continues to evolve and can now be found as high ability, talent, high achievement or high aptitude (Sánchez-Escobedo, 2022). Although the term has some variations which are included in this introduction, 'gifted' and 'talented' are widely accepted throughout the world. Currently, there is a shared conviction among scholars and professionals on the critical importance of the early identification of giftedness in childhood, noting that timely interventions are key to the development and realization of individual

[1] *Doctoral student, School of Humanities and Education, Tecnologico de Monterrey, Mexico. E-mail: A00838045@tec.mx*
[2]*Researcher, Department of Design, School of Architecture, Art and Design (EAAD), Tecnologico de Monterrey, Mexico. E-mail: jorge.sanabria@tec.mx*
[3] *Researcher, R4C Interdisciplinary Research Group, Institute for the Future of Education, Tecnologico de Monterrey, Mexico. E-mail: jorge.sanabria@tec.mx*

potential (Baudson & Preckel, 2016). Based on these conditions, theories have been proposed to explain giftedness.

The concept of giftedness has attracted the attention of researchers in education, psychology, neurology. Many have tried to define and classify it, but as noted by Sternberg and Ambrose (2021) point our, it is only a label that defines a profile according to what is required in the country where the term is developed. Furthermore, it is assumed that the curriculum is built around cultural needs, so if the culture has not integrated this profile of people into their daily lives, the programmes will not change for the benefit of the students.

Several authors have worked on establishing a standardized method to enable parents, psychologists, teachers and even students themselves to identify their outstanding aptitudes (Zavala and de la Torre, 2021). The person or function that should assess the learner should also be defined. Usually, the teacher has the closest contact with the student and should therefore be assessed. Consequently, the factors that determine the profile of outstanding aptitudes should also be standardized, as discrepancies have been found between research studies.

In countries with advanced cultural development, gifted individuals may not appear very different from their peers, as everyone is expected to undertake projects involving critical and creative thinking, driven by the demands of society. Finland or Canada, for example, have a solid and demanding curricula for their students. In developing countries, on the other hand, the focus is not on schooling but on meeting basic needs, which is why it is difficult to find research on the subject in Latin American countries.

Several bodies have further refined this concept. The American National Association for Gifted Children refers to "those who demonstrate outstanding levels of aptitude (defined as an exceptional ability to reason and learn) or competence" (Baks et al., 2021). This conceptualization is broad, but encompasses the ideas of various scholars in the field of giftedness. An established classification of theories of giftedness offers a twofold division. At one end, it identifies the harmonious theory, which states that all gifted students present the same characteristics throughout their lives and in all areas of their lives, including the social aspect (Baudson & Preckel, 2016). In contrast, the disharmonious theory states that these students may present differences among themselves and between the stages of their lives due to socio-emotional deficits or low motivation, and may even present attention deficits depending on the context in which they develop (Bareiß et al., 2023).

Well-known models offer different perspectives on giftedness. In 1978, Renzulli proposed the Triadic Enrichment Model, emphasizing the combination of intelligence, motivation, and creativity in defining high abilities (Dereli & Deli, 2022). Sternberg agrees with the importance of intellectual ability and creativity, adding task involvement as a key element and stressing the evolution of these students over time and circumstances (Sternberg & Ambrose, 2021). Meanwhile, Gagné distinguishes between talent and high ability, focusing on the natural, mental and physical capacity to define the latter, and questioning whether they are acquired or innate (Gagné, 2020).

Accordingly, this study seeks to answer the following research question:

- *What are the prevailing characteristics of research on giftedness?*
- *What are the challenges and barriers to current research and practice in gifted research?*

To this end, a systematic literature review was conducted to analyze the common characteristics of gifted individuals, focusing on their profiles. The analysis involved an examination of publication metrics to assess the prevalence of research on giftedness, study methodologies used in the existing literature, approaches to identifying and supporting gifted individuals, and the use of technology in relevant studies. By comprehensively examining these four categories, this review aims to provide valuable information for understanding and supporting giftedness.

Theoretical framework

Commonly accepted characterizations of giftedness

The gifted profile encompasses a long list of characteristics. According to Jawabreh et al. (2022), advanced memory, perception, vocabulary, inquiry and interest, emotional maturity, social development, creativity, and abstract thinking are all advanced stages of development. Martínez and Martínez (2021) note that gifted individuals tend to use technology as a means of collaborating and constructing new knowledge and/or learning.

Gifted students seek new solutions to the problems they face, which enables them to develop critical and scientific thinking. These are considered sub-competencies of complex thinking, along with innovative and systemic thinking (Ramírez-Montoya et al., 2022). It is also known that gifted

students can analyze information to construct possible situations in less time than average. They use concepts such as "scientific proofs, mental processes, constructive evaluation for both positive and negative opinions" and often question critically (Schreglmann & Öztürk, 2018).

In a study on the differences in the use of critical thinking, in which gifted and non-gifted students were assessed to verify the application of the five phases of critical thinking according to Fabio et al. (2023), significant differences were found in their use and were reported to be greater in gifted students. It was also found that the most commonly used phases by the gifted were the first and third, namely, the ability to quickly grasp the nature of the problem and to judge the credibility of statements, and the logical strength of actual or intended inferential relationships between statements, descriptions, questions, or other forms of representation.

Studies have provided interesting insights into complex thinking where science has been of interest in the development special programs for gifted. With the development of STEM programmes, it has become a common goal for content and curriculum designers to influence attitudes towards science, increase students' scientific achievement, and increase the number of people who will pursue a scientific careers in the future (Ugulu, 2020).

The challenging ability of gifted students to question is related to their sub-competency of scientific thinking. Because of this ability and the lack of a challenging curriculum, students are easily distracted or even bored in class or, on the contrary, end up asking too many questions, which can be perceived as a superior attitude (Akgül, 2021). However, they do so because they demand more information from their teachers and may even have researched the topic in question well in advance of the lesson, leading them to have more knowledge than their peers. Consequently, it is not only the characteristics that constitute giftedness that need to be studied, but also the factors that influence the appearance or development of these characteristics.

Three major perspectives on giftedness

Giftedness is not just about high IQ. Authors such as Renzulli argue that gifted individuals acquire greater potential when they can integrate certain elements. His three-ring theory describes the interaction between intelligence, creativity, and motivation and dedication as key characteristics of giftedness (Dereli & Deli, 2022). Therefore, gifted students need environment where they are challenged and where they can practice tasks that are different from the average.

Sternberg developed his own theory in line with Renzulli, suggesting three main elements for identifying giftedness: intellectual ability, creativity, and task involvement (Sternberg & Ambrose, 2021). He argued that the concept of giftedness is a label that can change depending on where it is identified and the context in which the profile is determined. For Sternberg, this profile evolves over time along with the situations experienced by the individual.

Meanwhile, Gagné focused on exploring the difference between talent and giftedness, as some scholars refer to this concept as talent or high ability. He also debates whether giftedness is innate or acquired over time (Gagné, 2020). He argued that giftedness consists of three aspects: natural ability, mental ability, and physical ability, and he noted that talent can be applied to fields of action such as academics, engineering, science and technology, the arts, social service, management or sales, business operations, games, sports, or athletics.

Giftedness and intelligence cross-references

In the view of Sánchez-Escobedo et al. (2021), a gifted person is considered to have inherited high ability in at least one area of knowledge—but usually more—and this ability is expected to be nurtured by teachers and parents. The authors add that gifted students must have an IQ above 130 and demonstrate the ability to produce valuable outcomes of an intellectual nature; with the right motivation, challenge, and support (through differentiated enrichment or acceleration), they are likely to become high achievers (Sánchez-Escobedo et al., 2021). Their findings are consistent with those of Renzulli and Sternberg regarding the motivation and task engagement of gifted individuals.

From this perspective, focused on the level of IQ, the scientist Terman (Gutierrez, 2022) identifies giftedness by applying an intelligence test where the result must be 2 ½ standard deviations above the mean score of 100 on Binet's version of the intelligence test. This produces a different result from his previous postulation that the IQ must be 140 on this scale.

Marlan, for his part, proposed a model in which, in addition to a high intellectual level, the gifted person must achieve exceptional results in creative thinking, specific academic aptitude, leadership ability, visual or representational arts, and psychomotor ability (Gutierrez, 2022). Thus, Gagné's concept is confirmed by covering more areas than expected in this profile.

Close context influence on gifted individuals

When considering the influence of context, we refer to both school and family, with the latter being the most important as it is where the gifted individual can ground what is taught in school. In addition, there may be specific parental patterns that affect or cause underachievement (Alexopoulou et al., 2019). If gifted students have a good academic programme but are not encouraged at home and are kept away from others, their development is not complete. Thus, isolation becomes a critical socio-emotional factor of great influence, which may be related to misconceptions and to the child being a 'misfit'.

Lack of knowledge may arise mainly from having the same family or friends. In a study conducted by Peebles et al. (2023), it was noted that many of the participants were unaware of the concept of giftedness, and in particular that this lack of knowledge came mainly from within the gifted circle. In particular, they reported that parents felt that they were bragging about their children's achievements when these were only age-appropriate results. Another study in Turkey (Konik, 2023) states that parents of gifted children perceive parenting as demanding, challenging, and requiring extra patience and fun, while demanding self-development and involvement in the community.

The influence of parents on gifted children is so important that Eroglu et al. (2022) conducted a study to understand parents' views on what giftedness means t. It was found that parents perceived different characteristics of gifted children in the preschool period, such as motivation and curiosity to learn, self-learning, interest, creativity, advanced cognitive skills, advanced language skills, advanced motor skills and different personality traits. Once parents are clear about the supportive role they should play for their children, it becomes easier for them to develop their potential.

The influence of teachers on the development of giftedness must also be considered, as they are the most direct source of knowledge and motivation for the student. In this sense, teachers must also have enough information to understand the concept of giftedness and be able to provide what the student needs. A study conducted by Sánchez-Escobedo et al. (2020) showed that primary school teachers have little knowledge about the characteristics and education of gifted students. As a result, they do not have the necessary knowledge to teach the students.

Gifted students find that their teachers have a significant influence on their adjustment to university (Almukhambetova & Hernández-Torrano, 2020), as they perceive the leading role that teachers play in the development of their talents (Gierczyk & Pfeiffer, 2021). This influence goes beyond

academic performance, encompassing aspects such as behavioral patterns, motivation to learn, and career choices throughout life (Mălureanu & Enachi-Vasluianu, 2021), and is reinforced by educators' personal characteristics of educators, which are associated with greater student engagement (Aboud, 2023; Susantya & Hawadi, 2019).

Furthermore, in the study conducted by Koshy et al. (2017), in which both parents and teachers of gifted students were interviewed, most parents expressed that without the education system and the programme components offered to their children, they would hardly progress and reach their full potential. This study took place in a community with high crime rates, so parents were grateful to have such programmes for their children, which also offered guest lecturers and critical thinking training.

Self-perception and misalignment

In addition to the influence of context and isolation due to ignorance of the profile, we must also consider the self-perception of gifted individuals. In a study that focused on comparing factors that contribute to success on Advanced Placement (AP) exams among gifted Hispanic students, gifted White students, and Hispanic students who were not identified as gifted, no significant differences in success on AP exams were found between gifted Hispanic students and gifted White students. In addition, Hispanic students identified as gifted were significantly more likely to pass AP exams than their Hispanic peers not identified as gifted (Graefe & Ritchotte, 2019). In some cases, gifted students prefer not to be identified, as the demands may exceed what they feel are capable of; on the other hand, there are some gifted students who want to be labelled to feel distinguished.

Perceived social competence and other areas of self-concept that may be related to students' strategies for coping with or denying their giftedness in terms of feeling different are also of interest (Casino et al., 2021). It is not only important how others see them that is important, but also how they see themselves, whether they know themselves as well as others think they do, or what it would take to improve. In this regard, Akgül (2021) shows that when gifted students lose motivation for their lessons, they may decrease their academic performance and, in extreme cases, engage in risky behaviour. This implies how critical it may be for teachers to have individual meetings with gifted students to recognize their unique differences, plan different activities accordingly, and develop creative and scientific thinking skills.

The conceptualization of giftedness has received considerable attention from scholars in a variety of fields, who have emphasized the importance of early identification for the effective development of potential (Sholehah & Putro, 2022; Ponomaryova et al., 2022). Overall, understanding and addressing the complex nature of giftedness requires multifaceted approaches that address both individual and contextual factors.

Method

This section describes the methodology used in the study, which integrates both a Systematic Literature Review (SLR) and content analysis to ensure a comprehensive evaluation of the research topic. The research process included the establishment of inclusion and exclusion criteria as detailed below. In addition, the search strategy was carried out using Scopus and Web of Science, chosen for their broad coverage and reliability in social science and educational research.

Research Design

This study uses a mixed method approach, combining SLR and content analysis, to address the research questions in a comprehensive manner, taking into account the challenges and characteristics of giftedness. The SLR was carried out to identify and synthesize the existing literature on the topic, while the content analysis was used to categorize and analyze the themes and patterns that emerge from the selected articles.

On the one hand, this study was conducted according to the PRISMA methodological guidelines, which were updated in 2020 to ensure the reliability of the information collected. SLRs aim to identify, evaluate, and compare evidence from primary studies using methods that analyze and interpret the evidence that exists in relation to the research question (Carrizo & Moller, 2018). The PRISMA 2020 version is primarily used in systematic reviews involving mixed methods (including quantitative and qualitative studies), but the associated reporting guidelines supporting the presentation and synthesis of qualitative data should be consulted (Page et al., 2021). This framework has been designed to help authors present their research findings in a transparent manner. The type of SLR chosen for this study is a background review, which is commonly used to inform research design decisions, as it provides a theoretical context or identifies a gap in the

literature that the study aims to fill (Templier & Paré, 2015; Levy & Ellis, 2006 mentioned in Xiao & Watson, 2017).

Content analysis, on other hand, is the process of systematically examining and interpreting the content and meaning of texts, whether written, visual, or other types. This analysis involves the identification of patterns, themes, categories, and meanings within the material being analysed, with the aim of gaining a better understanding of the message or information contained in the texts (Cohen et al., 2018).

In conducting the SLR, the three stages suggested by Xiao & Watson (2017) were considered as shown in Figure 1. First, the need to conduct the SLR was formulated, mainly to identify possible gaps in the literature on the characteristics that identify gifted individuals worldwide. A database was created using a spreadsheet, containing information from various documents, arranged alphabetically by fields such as database source, author(s), document title, year, document type, journal or publisher, DOI, abstract, keywords, language, and access type.

Figure 1. Research process

Planning the review:

The focus of the SRL was to identify the characteristics that define gifted individuals worldwide, to understand the methodologies employed in the studies, and to examine the support systems and technologies used to support gifted individuals.

Development and validation of the review protocol:

In the present study, 15 disaggregated questions were defined and grouped into four categories (publication metrics, study methodology, giftedness identification and support of giftedness, and technology used).

Population and Sample

Data for the SLR were obtained from the Scopus and Web of Science databases because of their extensive coverage and reliability in social science and educational research. The content analysis was carried out on the same set of 37 articles identified through the SLR process (see Table 1 in the appendix for more information).

Data Collection Tools

The search was initiated in two databases which published high quality journals and which, in order to ensure the quality of their publications, subject them to peer review. These databases were Scopus and Web of Science. In this review, only the titles of the articles were considered, and the database was cleaned by removing duplicate articles.

Data Collection

The SLR process followed the updated PRISMA 2020 guidelines, ensuring that rigorous inclusion and exclusion criteria were applied to select relevant studies. Content analysis was carried out using MAXQDA software and data were categorized according to research questions, repeated comments, and emerging themes and grouped into three main categories: challenges, characteristics, and limitations.

The inclusion and exclusion criteria were selected based on the needs of this study to determine the general characteristics of giftedness around the world. The selection was made in this way because the aim was to have a greater opportunity to recognize what the scientific community has done in different areas and types of giftedness. In this context, it was not necessary to specify the typology of giftedness, since the intention was precisely to carry out a general investigation. However, as STEM, Asperger's and ADHD are topics that have been widely associated with giftedness, we excluded articles that included these data, as the intention was to examine the broader concept of giftedness. In this review, we considered the keywords and abstracts of the articles.

These selected criteria are broad because they capture and incorporate the questions the SLR seeks to answer and the practical application of the criteria. They were chosen in this way because if they were too detailed, the selection could become overly complicated and lengthy. Inclusion criteria for the selected articles were that they were published between 2012 and 2024, were written

in English and included at least one of the keywords of the study (giftedness and characteristics). On the other hand, exclusion criteria were that other SLR, meta-analysis, grounded theory and articles that included another condition in addition to giftedness, such as STEM, ADHD or Asperger's, would not be considered. Articles with less than two keywords were excluded.

Trustworthiness of the data

To ensure the trustworthiness of the data, all selected articles underwent a thorough quality assessment. Both methods followed established protocols to preserve the validity and reliability of the findings. To assess the quality of the articles, the full text was reviewed using research questions to extract and analyse the data required for this study. Content analysis involved coding the textual data to identify key themes and categories. The use of MAXQDA software ensured a systematic and replicable approach to data coding and categorization.

Data Analysis

The SLR identified key studies that addressed the research questions, which were then subjected to content analysis. This analysis resulted in three categories: challenges, characteristics, and limitations. These categories were chosen to facilitate a detailed analysis of the research questions: the most frequently mentioned characteristics in the articles and the challenges in gifted education research.

For the content analysis, the analysis in MAXQDA software resulted in the identification of three primary categories: challenges, characteristics, and limitations of the study. Each category includes specific attributes related to gifted students, which are detailed below along with their frequency of occurrence.

Analyze and Synthesize Data

The analysis involved categorization and quantitative and qualitative analysis. The SRL data were categorized according to four main research categories: publication metrics, study methodology, giftedness identification and support of giftedness, and technology used. Statistical analyses were performed on numerical data, such as the number of studies, countries of research, and frequency of keywords. This was followed by thematic analysis of qualitative data, such as descriptions of research methods, characteristics of giftedness, and types of support provided. Finally, the results

were synthesized to provide a comprehensive overview of the current state of research on giftedness. This synthesis included the identification of common trends, gaps in the literature and areas for future research.

The PRISMA 2020 guidelines were followed to ensure transparency and reliability in the reporting of the systematic literature review. The process included documenting the flow of information through the different phases of the review (identification, screening, eligibility, and inclusion). More information about this process can be found at this link:
https://doi.org/10.5281/zenodo.12631295

For the content analysis, the main categories were defined as follows:

- *Challenges:* This category refers to the challenges and difficulties identified by the authors in their current research. Five sub-categories were identified, including: teacher training and development, identification and assessment of giftedness, parental and environmental influences, curriculum and teaching methods, and social and emotional needs.
- *Characteristics:* This category refers to features defined by the authors in their studies. Five subcategories were identified: intellectual traits, learning behaviour, emotional traits, social skills, and motivation and interests.
- *Limitations:* Refers to the limitations of the study, including the next subcategories, sample and generalizability, methodological concerns, need for further research, contextual factors, and participant characteristics.

Findings

The findings from answering the research questions are presented below. They are interpreted from two perspectives, the characteristics of giftedness research and the challenges of giftedness research.

Characteristics of research on giftedness

The database was analyzed according to the categories of publication metrics, study methodology, giftedness identification and support of giftedness, and technology used. In terms of publication metrics, 376 studies were found in Scopus and 300 in Web of Science from 2012 to 2024, with 22 of the 37 selected studies conducted between 2020 and 2022. Turkey and Saudi Arabia led in terms of publication locations and author affiliations, each contributing several articles. The journals

with the most publications were the Journal for the Education of Gifted Young Scientists, Frontiers in Psychology, Gifted Education International, International Journal of Innovation, Creativity and Change, Journal of Advanced Academics, and Pegem Egitim ve Ogretim Dergisi. Common keywords included 'gifted', 'characteristics', 'giftedness', 'students', and 'children'.

Regarding methodology, 26 of the 37 studies specified their methods, with 14 focusing on case studies and 12 on empirical research. Most studies used qualitative approaches, followed by quantitative and mixed methods. Questionnaires and interviews were the main methods used to collect data. In identifying and nurturing giftedness, the main characteristics identified were cognitive and learning skills, and socio-emotional characteristics. Teachers and specialists were the main source of identification, with some input from parents and self-assessment. Studies focused mainly on the preschool and elementary levels, and less on the high school and higher education levels. Types of facilities mentioned included mainstream schools, special schools, special shifts, extra courses, and science and art courses.

In terms of the use of technology in the research, 17 studies detailed their digital tools, including Psychopy, Microsoft Teams, Google Forms, Alceste, SPSS Statistics 26, Office 365, Nvivo 10.0, PERMATApintar National Gifted Center, SAM, Novo, and Nearest Neighbor. These technologies were used mainly for data analysis, communication with participants, and psychometric evaluation.

Challenges in giftedness research

The results of the three categories explored in this study are presented below: Challenges (figure 2), Characteristics (figure 3) and Limitations of the studies (figure 4).

The data underline the critical importance of teacher training in identifying and nurturing gifted students. Studies emphasize the need for educators to understand diverse characteristics and to implement effective educational strategies. Balanced development of students' thinking, motivation, and general skills requires comprehensive teacher training and specialized assessment tools for identify and support gifted students (Makkonen et al., 2022; Mohamed & Elhoweris, 2022). Identification processes remain central, with the need for refined assessment tools and early screening strategies. Parental influence and socio-economic status significantly shape the learning environment. In addition, addressing the social and emotional needs of gifted students is critical to their holistic development.

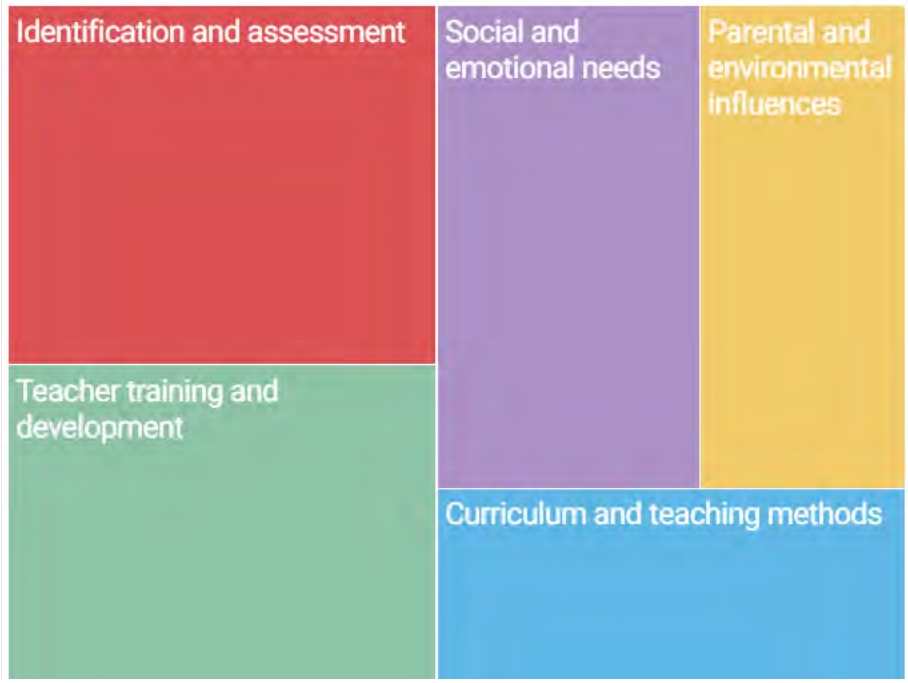

Figure 2. Challenges in giftedness research

In the articles reviewed, authors show that gifted students exhibit a wide range of characteristics in the areas of intellectual traits, learning behaviour, emotional traits, social skills, and motivation and interests. Intellectually, they show high intelligence, exceptional memory, strong verbal skills, and advanced cognitive abilities. In terms of learning behaviour, gifted students show accelerated rates of learning, a preference for independent work, and consistently high academic achievement. Emotionally, they tend towards perfectionism, self-awareness, and high levels of commitment, alongside traits such as willfulness, hypersensitivity, and the ability to be self-critical. Socially, gifted individuals often exhibit leadership qualities, empathy, and a well-developed repertoire of social skills. Motivationally, they show a strong desire for challenge, competition, research, and a passion for learning, including talents such as musical interest.

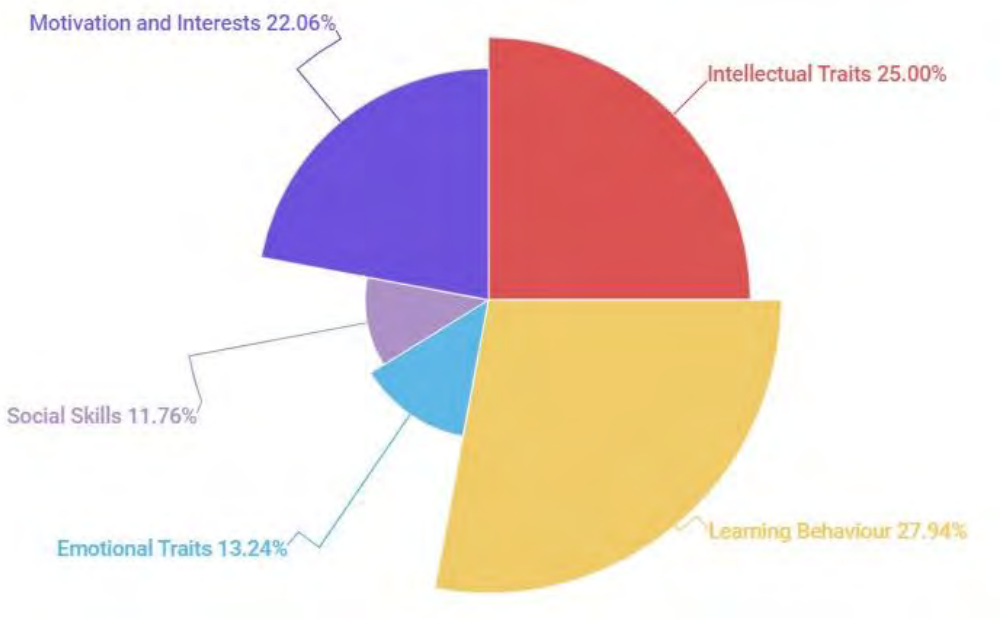

Figure 3. Characteristics of giftedness

Limitations of the included studies relate to sample size and diversity of participants, which may affect the generalizability of the findings (Kaya & Akgül, 2021; Shin & Park, 2020). Methodological concerns include the reliability and validity of data collection instruments, subjective assessments, and response restrictions. The results are based on self-assessments and perceptions, and the focus of the studies on specific school contexts limits the transferability of the findings to other settings (Makkonen et al., 2022).

Further research is needed in the field of giftedness, particularly longitudinal studies (Baks et al., 2021) with larger, more diverse samples, and varied experimental designs to increase validity. In addition, contextual factors such as educational setting, teacher experience, and cultural influences have a substantial effect in research findings. Participant characteristics, including demographic imbalances and varying levels of engagement, further influence the applicability and generalizability of findings.

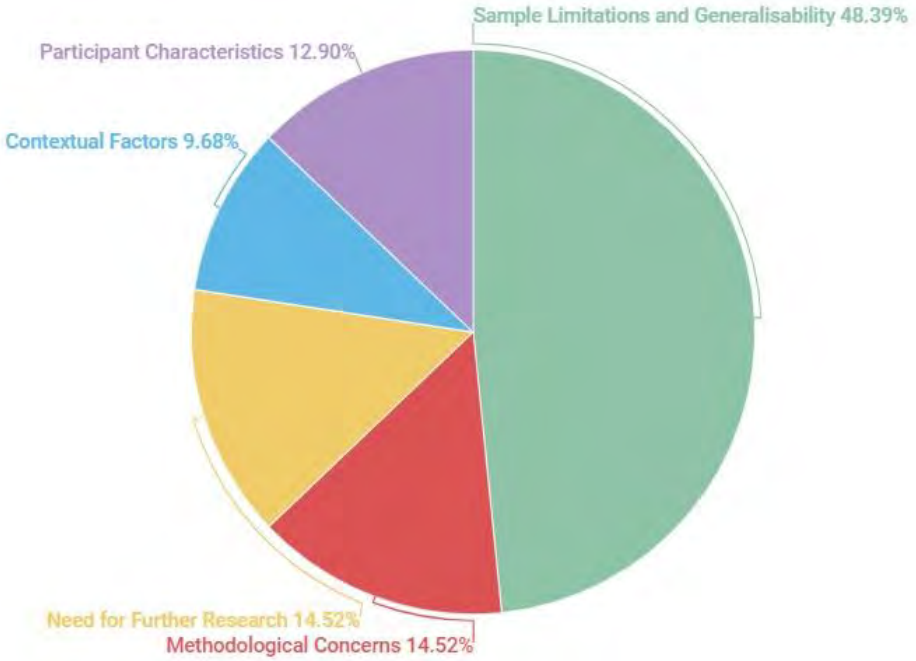

Figure 4. Limitations of the studies

Discussion

Below we discuss the findings that seek to answer our two research questions. They frame our comprehensive exploration and shape the existing information on giftedness.

a) There are still no standardized measures to identify gifted individuals. As shown in Figure 3, it has been recognized that the characteristics of giftedness are mainly related to learning behaviour and intellectual characteristics. This is in line with Garcia et al. (2021) who question the way in which gifted students are currently identified. This is also supported by the study by Sanchez-Escobedo et al. (2020), who report that in practice, intelligence tests such as the Wechsler Intelligence Scale for Children (WISC) and the Wechsler Preschool and Primary Scale of Intelligence (WPPSI) are widely used to identify gifted children. Nonetheless, a consensus approach to identifying giftedness using a combination of observation, psychometric assessment and focused interviewing remains to be developed.

b) Teacher training is relevant to the development and identification of gifted profiles. As shown in Figure 2, one of the main challenges in the field of giftedness is the training of teachers. In support of this, Jawabreh et al (2022) state that teachers of young learners should have the

knowledge to identify and maximize their abilities. This is also consistent with the study by Sánchez-Escobedo et al. (2020), which found a positive association between teacher training and knowledge of gifted students. The latter study also points out that teacher training helps to overcome misconceptions and prejudices about gifted students and increases the likelihood of adopting effective teaching strategies. Given these findings, investment in comprehensive teacher training schemes is essential to accurately identifying and effectively serving gifted students and thereby improving their educational outcomes.

c) The very nature of giftedness research limits the generalizability of its findings. This lack of transferability (Figure 4) and the predominance of case studies and empirical research within the sample analyzed underscores the focus on practical applications and data-driven investigations. Furthermore, as reported by Holmgren et al. (2023), case studies in gifted education continue to address the needs of learners and teachers in practice, highlighting pedagogical challenges and opportunities. This is also the line taken by Lewis et al. (2020), who mention that these types of studies have a positive impact on teachers' perceptions of culturally diverse learners and promote changes in teachers' perceptions and beliefs (Lewis et al., 2020). In light of the above, the lack of mainstreaming of research on giftedness, despite its valuable insights, continues to hinder its wider application and impact.

Conclusions

At the heart of this study were two research questions, which focused on revealing the predominant characteristics of giftedness reported in global research from 2012 to 2024, and the challenges and barriers to current research and practice in gifted education around the world. The analysis of the information gathered suggests that a) standardized measures for identifying giftedness are not yet available; b) adequate teacher training is essential for the development and identification of gifted profiles; and c) the nature of giftedness research limits its generalizability. The analysis shows that scholars have not established a standardized diagnostic method because they do not have a common definition of giftedness. Given these differences in the conceptualization, scholars focus their research on the characteristics based on the theories with which they have the greatest affinity, according to the country in which they are located and their knowledge needs.

Among the possible implications for practice, it can be seen that the lack of standardization of tests to identify giftedness has not yet permeated the educational environment, so that more training on this profile is needed in order to develop appropriate pedagogical strategies. Teachers, psychologists, policymakers, and other professionals can benefit from learning more about gifted students. Teachers should include information on giftedness in their curricula to keep abreast of the latest research. Psychologists can use technology to assist in the identification and provision of gifted individuals. Policymakers should create standards and programs to help gifted students receive good education. Other professionals should work together to support gifted students across a range of settings. By applying these strategies, a more supportive and effective educational environment can be developed to nurture the potential of gifted students. In terms of research implications, this information helps to gauge the global interest, trends, and terminology surrounding giftedness. The prevalence of qualitative approaches suggests a focus on a nuanced understanding and exploration of the experiences of gifted individuals. These insights reveal a multifaceted approach to understanding and nurturing giftedness across different educational stages. Data on digital technologies also provide valuable information on how technology enhances research methodologies, data collection, and analysis in the field of giftedness.

The study has some limitations. Based on the information gathered in this study, there is no basis for determining whether culture influences the characteristics of gifted individuals. Definitions vary mainly in two aspects: intelligence and high ability. However, these variations do not correlate with the country of origin of the study, or the population studied, but with the research approach used. As the diagnostic tools used by the authors vary, we cannot say that those identified as gifted in one context are indeed gifted in a global sense. We have only been able to identify aspects such as the diagnostic method used, the educational level at which it was carried out, the country of application and who carried out the diagnosis. Future research should validate methods for diagnosing giftedness so that they can be used worldwide. In addition, more comprehensive identification methods, both quantitative and qualitative, should be explored to accurately identify gifted students. Cross-cultural studies examining how different cultural perspectives shape the conceptualization and identification of giftedness may be an area of interest. Finally, while case studies continue to contribute to the understanding of the phenomenon, longitudinal studies are needed to follow the development and outcomes of gifted individuals over time, providing valid insights into their educational and life trajectories.

Acknowledgments

The authors would like to thank Tecnologico de Monterrey for the financial support provided by the 'Challenge-Based Research Funding Program 2023,' Project ID #IJXT070-23EG99001, entitled 'Complex Thinking Education for All (CTE4A): A Digital Hub and School for Lifelong Learners'. We also acknowledge the academic support of the Writing Lab, Institute for the Future of Education, Tecnologico de Monterrey, Mexico.

Additional information

Data deposition

The data supporting the findings of this study are openly available at https://doi.org/10.5281/zenodo.10498951

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Appendix

Table 1

Journals information

	Authors	Title	Journal
1	Aubry A.; Bourdin B.	Alerting, orienting, and executive control in intellectually gifted children	Brain And Behavior
2	Kaya N.G.; Akgül G.	Evaluating online education for gifted students: Parents' views	Gifted Education International
3	Makkonen T.; Lavonen J.; Tirri K.	Factors That Help or Hinder the Development of Talent in Physics: A Qualitative Study of Gifted Finnish Upper Secondary School Students	Journal Of Advanced Academics
4	Keleş T.	A Comparison of Creative Problem-Solving Features of Gifted and Non-Gifted High School Students	Pegem Egitim Ve Ogretim Dergisi
5	Mohamed A.; Elhoweris H.	Perceptions of preschool teachers of the characteristics of gifted learners in Abu Dhabi: A qualitative study	Frontiers In Psychology
6	Dereli E.; Deli H.	Pre-school teachers' knowledge and needs related to noticing gifted children and the enrichment model	Participatory Educational Research
7	Reis-Jorge J.; Ferreira M.; Olcina-Sempere G.; Marques B.	Perceptions of giftedness and classroom practice with gifted children – an exploratory study of primary school teachers; [Percepciones de superdotación y prácticas con niños superdotados: Un estudio exploratorio con maestros de educación primaria]	Qualitative Research In Education
8	Akgül G.	Teachers' metaphors and views about gifted students and their education	Gifted Education International
9	Jawabreh R.; Danju İ.; Salha S.	Exploring the Characteristics of Gifted Pre-School Children: Teachers' Perceptions	Sustainability (Switzerland)
10	Maznichenko M.A.; Neskoromnykh N.I.; Platonova A.N.; Mamadaliev A.M.	The Potential of Motion Pictures as a Non-Traditional Form of Pedagogical Information Relating to Working with Gifted Children	European Journal Of Contemporary Education
11	Aşik M.; Zelyurt H.	Investigation of Parents' Views Regarding the Recognition and Education of Specially Talented Individuals in Early Childhood Period	Pegem Egitim Ve Ogretim Dergisi
12	Ozcan D.; Uzunboylu H.	School counsellors' perceptions of working with gifted students	South African Journal Of Education
13	Alshammari M.M.; Rababah A.A.	Developing a scale for teachers to identify gifted students with learning disabilities in the primary stage in the Eastern Province of Saudi Arabia	International Journal Of Innovation, Creativity And Change
14	Gilar-Corbi R.; Veas A.; Miñano P.; Castejón J.-L.	Differences in personal, familial, social, and school factors between underachieving and non-underachieving gifted secondary students	Frontiers In Psychology
15	Weyns T.; Preckel F.; Verschueren K.	Teachers-in-training perceptions of gifted Children's characteristics and teacher-child interactions: An experimental study	Teaching And Teacher Education
16	Lagacé-Leblanc J.; Courtinat-Camps A.; Massé L.; Capdevielle V.; Baudry C.; Bégin J.Y.; Couture C.; Verret C.; Nadeaut M.F.	Regards d'enseignants québécois sur les élèves doués: points de vue diversifiés	Canadian Journal Of Education
17	Almerab M.M.; Bakhiet S.F.A.	The Saudi version of the gifted and talented checklist for parents: An instrument for rating the characteristics of gifted kindergarten children	International Journal Of Innovation, Creativity And Change

18	Bakx A.; Samsen-Bronsveld E.; van Elderen L.; van Horssen-Sollie J.	Self-Descriptions of High-Performing and Regular-Performing Primary School Students: An Open, Exploratory Study	Roeper Review
19	Al-Momani H.; Al-Oweidi A.	The psychometric characteristics of the Renzulli scale of behavioral characteristics (3rd edition) in the detection of gifted students in jordan	Journal For The Education Of Gifted Young Scientists
20	Shin W.; Park J.	Developing a List of Behavioral Characteristics of Creative Physicists During Their Growth Period	International Journal Of Science And Mathematics Education
21	Ali Albrahim F.A.; Al Rashidi S.N.	Identifying Gifted and Talented Students and Methods to Enhance their Development: A Conceptual Framework	Scientific Journal Of King Faisal University
22	Rodríguez-Nieto M.C.; Sánchez-González A.S.; Sánchez-Miranda M.P.	How Are the Gifted? Point of View of University Students	Educational Process: International Journal
23	Syafril S.; Yaumas N.E.; Ishak N.M.; Yusof R.; Jaafar A.; Yunus M.M.; Sugiharta I.	Characteristics and educational needs of gifted young scientists: A focus group study	Journal For The Education Of Gifted Young Scientists
24	Szabó J.; Révész G.	Eternal questions of gifted education from the aspect of university teachers	Journal For The Education Of Gifted Young Scientists
25	Zaia P.; Nakano T.C.; Peixoto E.M.	Scale for identification of characteristics of giftedness: Internal structure analysis; [Escala de identificação de características de altas habilidades/superdotação: Análise da estrutura interna]	Estudos De Psicologia (Campinas)
26	Ishak N.M.; Bakar A.Y.A.	Identification process of young gifted learners: The Malaysian experience	Journal For The Education Of Gifted Young Scientists
27	Zaitoun E.A.; Ellala Z.K.	Behavioural characteristics of gifted students in Grades 6-9 in Al Ain city	International Journal Of Education Economics And Development
28	Baudson T.G.	The mad genius stereotype: Still alive and well	Frontiers In Psychology
29	Baudson T.G.; Ziemes J.F.	The importance of being gifted: Stages of gifted identity development, their correlates and predictors	Gifted And Talented International
30	Yazici D.; Akman B.; Mercan Uzun E.; Kardeş S.	Preservice preschool teachers' views on the characteristics of gifted children	Journal For The Education Of Gifted Young Scientists
31	De França-Freitas M.L.P.; Del Prette A.; Del Prette Z.A.P.	Social skills of gifted and talented children	Estudos De Psicologia
32	Aljughaiman A.M.; Grigorenko E.L.	Growing up under pressure: The cultural and religious context of the Saudi system of gifted education	Journal For The Education Of The Gifted
33	Morosanova V.I.; Fomina T.G.; Bondarenko I.N.	Academic achievement: Intelligence, regulatory, and cognitive predictors	Psychology In Russia: State Of The Art
34	Cross J.R.; Cross T.L.	Clinical and mental health issues in counseling the gifted individual	Journal Of Counseling And Development
35	Büyükkidik, S; Simsek-Batar, A	Scaling Gifted Children's Dominant Characteristics Using Pair-Wise Comparison Method	Ankara Universitesi Egitim Bilimleri Fakultesi Ozel Egitim Dergisi-Ankara University Faculty Of Educational Sciences Journal Of Special Education
36	Klein, B; Fodor, S	TalentTiles: A New Descriptive Talent Identification Instrument Based on Teachers' Ratings	Future Of Research In Talent Development: Promising Trends, Evidence, And Implications Of

37	Villuendas-Rey, Y; Rey-Benguría, CF; Camacho-Nieto, O; Yáñez-Márquez, C	Prediction of High Capabilities in the Development of Kindergarten Children	Innovative 37Scholarship For Policy And Practice Applied Sciences-Basel