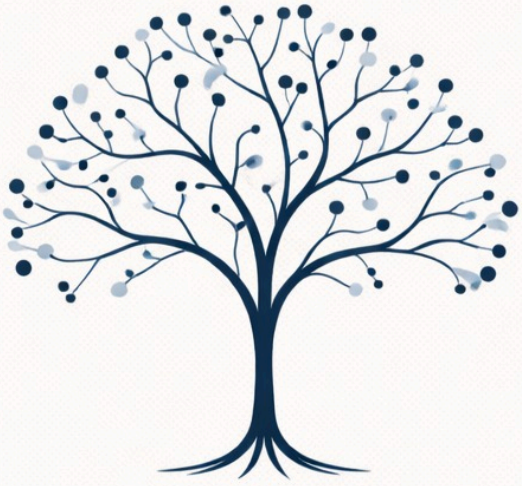
Inclusive Education and Gifted Learners

Academic, Social, and Emotional Perspectives



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GLOBAL ACADEMY

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Published by: Global Academy Publishing House
Cover & Design: Global Academy Publishing House
ISBN Number: 978-625-6276-75-8
doi number: https://dx.doi.org/10.59740/academy.98
Publishing Date: February 26, 2026

Adress-1: Konutkent 2955.St.Oyak 1 No:8/6 Cankaya/Ankara/TÜRKİYE
Adress-2: Turunç, 31.St.,No:12/E, No:8, 48740, Marmaris/Muğla/ TÜRKİYE

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PREFACE

Today, education systems are evolving from being structures that aim to transfer knowledge to a more inclusive and holistic understanding that focuses on the multifaceted development of the individual. In this transformation process, ensuring the effective and meaningful participation of individuals with different learning characteristics in educational processes has become one of the main priorities of education policies and practices. In this context, the inclusive education approach offers a broad perspective that focuses on gifted individuals with high potential as well as disadvantaged groups.

Although gifted students differ from their peers in terms of their cognitive capacity, creativity levels and learning speed; have unique needs in social, emotional and academic areas. Evaluating these students only with their academic achievements causes an important dimension of their development to be ignored.

As a matter of fact, the literature clearly reveals that meeting the mental and socio-emotional needs of gifted individuals plays a critical role in their psychological well-being and long-term success.

This book, under the title of "Inclusive Education and Gifted Learners: Academic, Social, and Emotional Perspectives", aims to address the place of gifted individuals in inclusive education environments from a multidimensional perspective. Chapters in the book; It covers a wide range of topics such as socio-emotional development, teaching strategies, family involvement, policy approaches, technology use, and intercultural perspectives. In this respect, the work not only provides a theoretical framework but also reveals important practical implications.

This study, prepared with the contributions of field experts, aims to be a comprehensive reference source for educators, researchers, policymakers, and practitioners by examining current debates on the education of gifted students in depth.

I would like to express my sincere gratitude to all the chapter authors who contributed to the creation of this work, the referees who contributed with their meticulous evaluations, and the publishing house who successfully managed the publication process. I hope that this book will contribute to the creation of more inclusive and equitable educational environments where gifted individuals can realize their potential at the highest level.

Prof. Dr. Ahmet KURNAZ
Editor

CONTENTS

CHAPTER 1

THE SOCIO-EMOTIONAL NEEDS AND WELL-BEING OF GIFTED STUDENTS

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Introduction

In all societies, some individuals demonstrate higher levels of development compared to their peers in areas such as academics, creativity, arts, and leadership (Renzulli, 2012). Individuals who learn more quickly than their peers, who possess higher capacities in leadership, creativity, and the arts, who have advanced academic abilities, who show high performance in areas of interest, who are independent and able to grasp abstract concepts, are defined as gifted (Ministry of National Education [MoNE], 2016). It is thought that if the development of individuals who demonstrate advanced development compared to their typically developing peers is supported, they will contribute more to society (Sevgili Koçak, 2020).

"No bird soars too high if he soars with his own wings."
William Blake

The education of gifted students has traditionally focused on cognitive and academic performance. Gifted children differ from their peers in terms of cognitive, social, and emotional characteristics and needs (Levent, 2011). They are sensitive and emotional and place great importance on justice and honesty in relationships. Although gifted children are responsible and perfectionistic, their social–emotional development is generally behind their intellectual development. Because their intellectual development does not progress simultaneously with their physical or socio-emotional development, they experience different socio-emotional needs and corresponding difficulties (Koshy & Robinson, 2016).

Socio-emotional needs ensure that individuals can adapt to their environment. Academic studies on gifted individuals often emphasize only cognitive development. However, it would not be wrong to say that issues related to their socio-emotional development—which is essential for life satisfaction—remain one step behind (İnce, 2023). Common difficulties include anxiety, perfectionism, fear, peer relationship problems, loneliness, school maladjustment, and depression (Hewitt et al., 2002; Peterson et al., 2009). In addition, gifted students may experience classroom maladjustment, low academic self-esteem, and depression when they fail to meet the high expectations of parents and teachers (Kurtulmuş, 2010).

Socio-emotional needs include the ability to understand oneself and the environment, maintain well-being with oneself and others, and regulate and comfortably express emotions (Delisle, 1985). Gifted individuals tend to have low life satisfaction and high anxiety levels (Tong & Yewchuk, 1996). Emotional and psychological difficulties may lead them into stressful processes and feelings of unhappiness (Tohum & Tortop, 2018). Psychological well-being depends on positive functioning across various areas of life, a positive self-perception, a sense of purpose, the ability to act autonomously, and awareness of one's own strengths and limitations (Keyes et al., 2002; Özen, 2005). An adolescent who fails to maintain psychological well-being may experience challenges in future social life (Kale, 2019). Additionally, Gönültaş and Karataş (2023) found a moderate positive relationship between psychological well-being and perceived social competence; as social competence increased among

gifted adolescents, psychological well-being also increased.

The purpose of this chapter is to examine gifted students' socio-emotional needs and well-being within a theoretical framework and to offer suggestions for educators, counselors, and policymakers. Psychological well-being is essential for the mental health of all individuals. The psychological well-being of gifted individuals has been studied in various ways in the literature, resulting in differing perspectives. Within this context, understanding giftedness solely as a cognitive construct is insufficient; therefore, the following section addresses socio-emotional development as an integral component of giftedness.

Giftedness and Socio-Emotional Development

In the literature on giftedness, various theoretical approaches exist, including those by Dabrowski, Renzulli, and Piirto. Dabrowski's theory of overexcitabilities includes five domains—sensual, psychomotor, imaginational, emotional, and intellectual. Renzulli's Three-Ring Model suggests that giftedness emerges when above-average ability, task commitment, and creativity coexist; the absence of one may prevent giftedness from manifesting. Piirto argues that genetic, emotional, cognitive, talent, and environmental dimensions form a pyramid, with giftedness at the top. All three frameworks highlight the significant role of affective and emotional characteristics in giftedness.

Development progresses as a whole, with interactions among developmental domains. For example, a child who feels accepted and loved within their environment

experiences positive emotional development, increased self-confidence, and healthy relationships. A socially active child interacts with their environment, which positively supports cognitive development. In gifted individuals, emotional, motor, and cognitive domains may develop at markedly different rates, a phenomenon commonly described as asynchronous development (Saranlı & Metin, 2012). Şahin (2018) notes that as intelligence scores increase among gifted children, inconsistencies across developmental domains become more likely. This is commonly referred to as asynchronous development (Guénolé et al., 2013). Asynchrony is a frequently observed and important concept in the development of gifted students.

Asynchronous development can lead to unique challenges (Morelock, 1992). Silverman (1997) states that the greater the gap between cognitive and physical development, the greater the child's internal, social, and educational maladjustment. Gross (1993) explains that the divergence between mental and chronological age increases with age. For example, a 6-year-old child with an IQ of approximately 135 has the body of a 6-year-old and the mind of an 8-year-old. At age 9, the child has the body of a 9-year-old but the mind of a 12-year-old. By age 12, the child's mental age may reach 16. Thus, asynchronous development is dynamic rather than static (Silverman, 1997). Another example is a cognitively advanced student who struggles physically in physical education classes, which can lead to loss of confidence and self-esteem (Sak, 2017).

Among the socio-emotional characteristics commonly discussed for gifted students are perfectionism, labeling,

twice-exceptionality, peer relations and loneliness, motivation, and unexpected underachievement. A strong desire to "do one's best and create meaning" is frequently observed.

Perfectionism

Perfectionism is defined by Flett and Hewitt (2002) as setting excessively high personal standards, striving for flawless performance, and evaluating one's behavior in an overly critical manner. While striving for high goals can be healthy, experiencing intense feelings of failure when falling short indicates maladaptive perfectionism (İlter, 2018).

Hamachek (1978) distinguishes two types of perfectionism:

1. **Healthy (adaptive) perfectionism**: striving for high goals and taking pleasure in achievement.
2. **Neurotic (maladaptive) perfectionism**: never feeling satisfied, avoiding mistakes, and developing low self-esteem.

Silverman, based on 25 years of counseling experience, states that perfectionism is common among gifted individuals, appears early, and may persist throughout life (2010). According to Silverman (2007), perfectionism in gifted students arises due to:

- The abstract nature of perfection, aligned with gifted students' advanced abstract thinking

- Asynchronous development, leading students to set standards appropriate for their mental rather than chronological age
- Frequent friendships with older individuals, raising expectations
- Early academic success, leading to low tolerance for failure
- A tendency to complicate simple tasks
- An overactive evolutionary drive for self-improvement

Schuler (2000) found that 87.5% of gifted adolescents display perfectionistic tendencies, and about one-third exhibit maladaptive perfectionism. Studies show that perfectionism has both beneficial and harmful dimensions—while adaptive perfectionism can increase achievement (Altun, 2010; Kanlı, 2011), maladaptive perfectionism is associated with anxiety, procrastination, low self-esteem, and depression (Bencik, 2006; Leana-Taşcılar et al., 2014).

Gifted children may procrastinate due to fear of failing to meet their high standards (Adelson, 2007). They may avoid performance tasks in areas where they feel less competent (İlter, 2020). Therefore, teachers and parents must recognize both sides of perfectionism and implement supportive strategies (Chan, 2010; Clark, 2015). Helping students adopt the mindset of "doing their best," understanding that mistakes are part of learning, and setting realistic goals are essential interventions (Siegle & Schuler, 2000).

Labeling

Labeling refers to categorizing an individual based on specific characteristics (Leana-Taşcılar, 2018). Clark (2015) emphasizes that when labeling a student as gifted, it is essential to explain not only what the label means but also what it does no*t*. The gifted label is a dual-status category—carrying both prestige and the risk of social exclusion.

Labeling can influence the educational and social environment. On one hand, it grants the student a valued status; on the other, it may increase the risk of being perceived as "different," leading to alienation (Hickey & Toth, 1990). This may weaken the student's sense of belonging.

In Turkey, Öpengin and Sak (2012) found that labeling does not dramatically change students' general perceptions, but experiences of loneliness, peer teasing, and family comparisons increase. Labeling also affects families; particularly in families with both labeled and unlabeled siblings, relational imbalances may emerge (Heller & Feldhusen, 1986).

Twice-Exceptional Learners

Twice-exceptional (2e) students are those who are both gifted and have at least one disability (learning difficulties, ADHD, sensory or physical impairments) (Reis et al., 2014). Their performance may fluctuate across both high and low domains (Foley-Nicpon et al., 2011).

Şentürk et al. (2022b) emphasize that these students lie at the intersection of special education and gifted education,

requiring dual support systems. The frequently observed "masking effect" (Baum, 1994; Baldwin et al., 2015) may take three forms:

1. Giftedness masking the disability
2. Disability masking the giftedness
3. Both characteristics masking each other, preventing identification

Thus, identification of twice-exceptional students requires multiple criteria, interdisciplinary assessment, and longitudinal observation (Atmaca & Baloğlu, 2022).

Educational support for 2e students should include:

- Strengths-based approaches
- Enriched instruction
- Socio-emotional support
- Therapeutic interventions

Baum, Schader, and Hebert (2014) found that strengths-based learning environments improve psychological safety, relationships, tolerance for frustration, and self-perception among 2e students.

Peer Relationships and Loneliness

The need for interpersonal relationships and emotional closeness represents a fundamental human motivation. Gifted students, due to their distinct characteristics, may experience difficulties in social interactions. Their advanced sense of justice, leadership skills, broad

interests, critical thinking, and heightened sensitivity may be misinterpreted by peers (Leana-Taşcılar, 2018).

Gifted children often prefer friendships with peers closer to their mental age than their chronological age (Gross, 2002). Gross's extensive research shows that while typically developing peers seek "playmates," gifted children seek "closeness, trust, and empathy" in friendships.

Loneliness is common among gifted students and may take the form of:

- **Chosen loneliness** (preferred for creativity and productivity)
- **Imposed loneliness** (stemming from exclusion, mismatch of expectations, or feeling different)

(Davaslıgil, 2004)

According to Sak (2017), lonely gifted students often feel they do not belong, believe they are different or inadequate, and think they are not accepted. Over time, this can lead to low self-esteem, social withdrawal, and depressive symptoms.

Teacher and parent support is crucial in reducing loneliness:

- Grouping gifted students with cognitive peers
- Creating a safe and accepting classroom atmosphere
- Allowing students to express emotions freely

- Building a classroom culture that embraces differences (Clark, 2015)

The need for friendship, particularly emotional closeness, acts as a driving force in both children and adults (Gross, 2002, p.1). Certain characteristics of gifted children may unintentionally complicate peer relationships and lead to social exclusion. Leadership, perfectionism, being perceived as arrogant, a strong sense of justice, and broad areas of interest are described as traits that make social relationships difficult for these students (Leana-Taşcılar, 2018).

Five stages regarding the friendship development of gifted individuals are listed as follows:

1. **Stage: "Playmate"** – In the earliest stage of friendship, the relationship is built on being play partners.

2. **Stage: "People to talk to"** – Sharing interests becomes an important factor in choosing friends. Conversations are no longer limited to games and activities.

3. **Stage: "Help and encouragement"** – The friend is now seen as someone who provides help, support, or encouragement. However, the child does not yet see the obligation to provide the same support in return.

4. **Stage: "Closeness and empathy"** – At this stage, the child realizes that comfort and support in a friendship flow in both directions and that giving

and receiving love are important elements of the relationship.

5. **Stage: "Safe haven"** – In this stage, the child perceives friendship as companionship characterized by deep and lasting trust, loyalty, and unconditional acceptance.

Sak (2017) stated that loneliness can develop due to personality factors as well as from a lack of satisfaction in social–emotional life. Individuals who cannot attain such satisfaction live as though they have no social environment, isolated from communication. In this regard, individuals who experience loneliness tend to have high perceptions of seeing themselves as different, not belonging to a group, and believing that they are unloved, unattractive, and not accepted by others (Sak, 2017). Davaslıgil (2004) noted that gifted children often appear as lonely individuals and that this situation develops due to environmental conditions.

Motivation and Unexpected Underachievement

Unexpected underachievement is defined as a person performing below their cognitive potential (Sak, 2017). This may be situational or chronic (Clark, 2015).

> Unexpected underachievement in gifted students can be associated with many factors:
>
> • Non-challenging school experiences
> • Low self-regulation and time-management skills
> • Low self-efficacy
> • Family pressure or conflict
> • School–student mismatch

• Overdependence on extrinsic motivation
(Reis et al., 2014; Şahin, 2018)

Reis et al. (2014) states that underachievement in gifted students often begins in the early elementary years and is related to "easy school experiences," where students never learn how to put in effort.

According to Rubenstein et al. (2012) Achievement Orientation Model (2012), three perceptions are necessary for success:

1. Valuing the task
2. Believing in oneself (self-efficacy)
3. Perceiving support from the environment

If even one of these factors is low, motivation decreases and performance declines.

For gifted students experiencing low motivation, teachers are advised to:

• Integrate the student's interests into the learning process
• Provide appropriate levels of challenge
• Structure classroom goals to support self-regulation
(Rubenstein et al., 2012).

Socio-Emotional Needs of Gifted Students

The socio-emotional development of gifted students is as critical as their cognitive development. Characteristics such as creative thinking, rapid learning, broad interests,

and high sensitivity directly influence their social relationships and subjective well-being (Clark, 2015; Leana-Taşcılar, 2018). Socio-emotional development covers a wide range, including emotional regulation, self-awareness, interpersonal relationships, sense of belonging, motivation, and meaning-making. Therefore, education for gifted students requires not only academic enrichment but also systematic support for emotional needs.

Schools that strongly support socio-emotional learning help students recognize, label, and appropriately express emotions; understand their own needs; solve problems; show empathy; use calming strategies; and make responsible decisions. These skills are vital for gifted students' personal adjustment and academic outcomes.

Core Socio-Emotional Need Areas

Need for Acceptance and Understanding

Gifted students often differ from their peers in thinking speed, humor, interests, and sensitivity. This increases their need to feel socially and emotionally "understood." They require adults and peers who can align with their intellectual level and interests. Feeling accepted is fundamental to feeling valued and competent.

Belonging and Attachment

Belonging allows students to feel connected to their class, school, or learning community. When gifted students feel different from their peers, they may struggle to feel part of a group, which increases the risk of isolation. Providing safe

environments and opportunities to interact with intellectually compatible peers is essential.

Emotional Regulation and Self-Awareness

High sensitivity, heightened awareness, and rapid emotional changes are common among gifted students. Thus, recognizing, labeling, managing, and expressing emotions appropriately is essential. Students with high self-awareness can better evaluate their strengths and areas for improvement.

Autonomy and Effective Expression

Gifted students often want control over their learning processes. Following personal interests, making independent decisions, developing creative projects, and expressing themselves openly are essential needs. Offering choices, differentiated instruction, and project-based learning supports these needs.

Meaning, Purpose, and Intrinsic Motivation

Gifted students are motivated not only by completing tasks but by finding meaning in them. If they cannot find purpose in learning, they may lose interest or withdraw academically.

Supportive Social Environment

Teachers, families, counselors, and peers play central roles in meeting socio-emotional needs. A supportive environment enhances performance and psychological resilience. Working with mentors and interacting with

peers with similar characteristics serve as protective factors.

Possible Consequences of Unmet Needs

When socio-emotional needs are unmet, gifted students may experience adjustment or behavior problems such as internal conflict, low self-esteem, academic burnout, isolation, anxiety, depression, and conduct issues. Emotional dysregulation can harm peer relationships and reduce motivation.

Twice-exceptional students may experience even more severe academic and social difficulties. Without appropriate support, they may develop negative self-perceptions.

Another significant consequence is unexpected underachievement. Although cognitively capable, students may perform below their potential due to reduced motivation, low self-efficacy, maladaptive perfectionism, peer mismatch, or negative school experiences.

All these findings show that gifted students' emotional, social, and motivational needs must be addressed alongside their cognitive strengths.

Social Support, Socio-Emotional Needs, and Well-Being in Gifted Students

Social support sources play a critical role in meeting the socio-emotional needs of gifted students. Support from family, teachers, and peers helps students feel safe,

understood, and valued. Since children's social experiences begin at home, parental warmth, consistency, and understanding are essential (Pavri & Monda-Amaya, 2001; Yıldırım, 2019). Families who understand giftedness can support their children more effectively (Elcik, 2015; Gür, 2017).

Peer support is also important, but cognitive and social maturity differences can complicate relationships. Thus, gifted students may be more vulnerable to isolation, loneliness, and bullying (Elcik, 2015; Field et al., 1998). Healthy peer relationships strengthen psychological resilience, especially in adolescence, when peer support becomes more influential than family support (Bokhorst et al., 2010).

Teacher support is a key factor. Teachers who recognize students' emotional needs and create safe environments contribute to students feeling understood and confident. Perceived teacher support improves school adjustment, reduces anxiety, and enhances self-concept (Demaray & Malecki, 2002; Paksu, 2021). Considering the high expectations and perfectionism pressures gifted students experience, affective support is even more critical.

When support from family, teachers, and peers is provided in an integrated manner, gifted students' socio-emotional needs are more effectively met, resulting in enhanced psychological well-being. Social support strengthens self-worth, life satisfaction, and resilience (Lee et al., 2015; Eryılmaz, 2012). Lack of support, however, is linked to isolation, depressive symptoms, anxiety, low self-esteem, and underachievement (Akkuş, 2022; Âlim, 2018).

Thus, supporting well-being is essential not only for happiness but also for realizing potential and developing a healthy identity.

Well-Being and Gifted Students

Gifted students' well-being is as important as their academic success. High cognitive potential alone does not guarantee well-being; in fact, high sensitivity, intense emotional reactions, perfectionism, social isolation, and high expectations may make them more vulnerable. Therefore, examining well-being from theoretical and practical perspectives is essential.

The Concept of Well-Being

Well-being is a multidimensional concept reflecting life satisfaction, psychological functioning, and the quality of social relationships. Two major theoretical frameworks dominate the field:

Subjective Well-Being (Diener, 1984)

Life satisfaction + high positive affect + low negative affect. Happiness is based on personal perceptions.

Psychological Well-Being (Ryff, 1989)

Includes autonomy, positive relations, self-acceptance, environmental mastery, purpose in life, and personal growth. These dimensions strongly relate to the developmental profiles of gifted students.

PERMA Model (Seligman, 2011)

Positive Emotion, Engagement, Relationships, Meaning, Achievement. All five areas are crucial for gifted students.

Key variables shaping gifted students' well-being include:

- self-efficacy
- emotional regulation
- social support
- teacher–student relationships
- school climate
- peer compatibility
- sense of purpose

These can function as protective or risk factors.

Research Findings on Well-Being in Gifted Students

Research shows that well-being among gifted students varies widely. Some demonstrate high well-being, while others display emotional risk factors. In Türkiye, Gönültaş & Karataş (2023) found that self-efficacy and social competence positively predict psychological well-being. Social support, peer relationships, and teacher bonds enhance resilience. International studies highlight overexcitabilities, which can be protective but also risky, increasing emotional intensity, anxiety, and stress.

Demographic factors such as gender, age, and school type also influence well-being. For example, girls may show higher emotional sensitivity, while boys may experience more performance pressure. As age increases, especially in high school, well-being may decline due to rising

academic expectations. Overall, research shows that the well-being of gifted students depends not only on their cognitive potential but also on the environmental support they receive. Loneliness, perfectionism, high performance pressure, and low social support are among the key risk factors that reduce well-being.

Socio-emotional development supports cognitive development and can either facilitate or hinder comprehension. Learning and retention depend on the functions of the brain's limbic system, which is also responsible for regulating emotional reactions. Therefore, individuals' psychological development interacts closely with their cognitive development. In children, the limbic system develops earlier than other regions. For this reason, the family environment and the school/classroom environment—through parents and teachers—play a critical role. Adults working with gifted children must have accurate knowledge about giftedness and be aware that their attitudes and feedback directly influence the child's limbic system (Clark, 2015; Leana-Taşcılar, 2018). Considering their distinct and high-level cognitive characteristics, it should not be overlooked that gifted students may, at times, require specialized support in social-emotional domains (as cited in Saranlı & Metin-Delisle, Lewis, & Freeman, 1985).

Conclusion and Implications

This chapter examined the socio-emotional needs and well-being of gifted students within a comprehensive theoretical framework. Drawing on established models of giftedness and well-being, the findings from the literature consistently indicate that gifted students' developmental profiles cannot be understood solely through cognitive

abilities. Their emotional intensity, heightened sensitivity, asynchronous development, and distinctive social experiences create unique socio-emotional needs that significantly influence both academic functioning and overall well-being.

The literature reviewed in this chapter demonstrates that gifted students are at increased risk for challenges such as maladaptive perfectionism, loneliness, peer relationship difficulties, unexpected underachievement, and emotional distress when their socio-emotional needs remain unmet. These difficulties are not inherent consequences of giftedness itself but rather emerge from mismatches between students' developmental characteristics and their educational or social environments.

A central conclusion of this chapter is that socio-emotional development and well-being function as foundational conditions for gifted students' long-term success. Research findings consistently show that psychological well-being is closely associated with factors such as self-efficacy, emotional regulation, perceived social competence, and social support. When these protective factors are present, gifted students are more likely to demonstrate resilience, sustained motivation, positive self-concept, and academic engagement.

The chapter also highlights the critical role of social support systems. Supportive family relationships characterized by understanding and emotional responsiveness contribute to students' sense of security and self-worth. Teacher support—particularly teachers' awareness of gifted students' emotional characteristics—

plays a decisive role in school adjustment, motivation, and academic persistence. Peer relationships, although sometimes challenging due to developmental asynchrony, represent an essential source of belonging and psychological resilience when appropriate peer matching and inclusive classroom climates are provided.

From an educational perspective, the findings emphasize that programs for gifted students should not focus exclusively on enrichment and acceleration. Instead, educational practices must integrate socio-emotional learning components alongside cognitive differentiation. Supporting emotional awareness, self-regulation skills, autonomy, meaningful engagement, and healthy perfectionism is essential for promoting balanced development.

The chapter further underscores the importance of recognizing diversity within gifted populations. Twice-exceptional students, in particular, require multidimensional assessment and individualized educational planning that acknowledges both strengths and vulnerabilities. Strengths-based approaches and supportive learning environments emerge as key factors in enhancing their psychological safety and academic participation.

In light of these findings, several implications can be drawn. First, teacher education and professional development programs should include systematic training on the socio-emotional characteristics of gifted learners. Second, school-based counseling and guidance services should prioritize preventive and developmental interventions that foster well-being rather than focusing solely on problem-oriented support. Third, educational

policies should acknowledge that gifted education is not limited to talent development but also involves nurturing emotional health and social belonging.

In conclusion, gifted students' well-being is shaped by the dynamic interaction between individual characteristics and environmental conditions. Addressing socio-emotional needs through coordinated support systems is essential for enabling gifted learners to realize their potential while maintaining psychological balance. A holistic educational approach that values emotional well-being alongside academic excellence is therefore fundamental to the healthy development of gifted individuals. This chapter contributes to the literature by synthesizing socio-emotional needs and well-being frameworks within a unified perspective on gifted education.

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CHAPTER 2

METAVERSE AND GIFTED STUDENT FROM AN INCLUSIVE LEARNING PERSPECTIVE

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Introduction

"When a flower doesn't bloom, you fix the environment in which it grows, not the flower."
(Alexander den Heijer)

Inclusivity in education is a concept that is increasingly emphasized today but is often used with different meanings. Referring to inclusivity in educational environments goes beyond students merely sharing the same classroom or learning environment. Here, what is expressed is how learning is made possible for everyone within the learning environment. In this context, inclusivity can be directly associated with the extent to which instructional processes are able to respond to students' differences. The concept of inclusive learning is also shaped through this relationship and refers to each student taking an active and meaningful role in the learning process. The origin of the concept of inclusivity also reflects this situation. The English word "inclusion" is derived from the Latin verb "includere," which means "to take in" or "to include."

Inclusivity can be meaningfully discussed when a teacher assumes pedagogical responsibility for each and every student in the classroom. In this sense, inclusivity refers to "*being the teacher of all children within the classroom context*" (Yılmaz Atman, 2023, p. 4). Such an understanding rejects the assumption of a single, shared norm or a standardized student profile. Instead, it acknowledges the diversity in students' readiness levels, learning paces, interests, and support needs as an inherent and legitimate component of the instructional process. Accordingly, an inclusive teacher adopts an ethical and pedagogical stance that requires teaching to be

intentionally designed from the outset to address the needs of all learners, rather than retroactively adapting instruction to fit a particular student profile (Florian & Black Hawkins, 2011).

Discussions of inclusive learning are frequently framed around students with disabilities or those from socioeconomically disadvantaged backgrounds, while gifted students often remain insufficiently positioned at the center of these debates. When the learning pace and depth of thinking of gifted students are not adequately addressed in heterogeneous classroom contexts, these learners may experience insufficient cognitive stimulation, limited depth of learning experiences, and challenges related to socioemotional adjustment (Adams Byers et al., 2004; Callahan et al., 2020; Stambaugh, 2017). From this perspective, inclusivity for gifted students should encompass the following interrelated components (Rogers, 2007):

i. continuous engagement in intellectually challenging learning activities aligned with their areas of interest and ability,
ii. opportunities for independent study and self directed learning in these areas,
iii. access to accelerated instructional opportunities in domains where such support is required,
iv. opportunities for social interaction and learning with peers who demonstrate similar ability levels, and
v. instructional adaptations based on student characteristics that minimize unnecessary repetition and promote accelerated and in depth learning experiences.

These requirements necessitate that inclusive learning for gifted students be addressed within the framework of contemporary pedagogical approaches, including universal design for learning, differentiated instruction, and systematic instructional adaptations.

Universal Design for Learning (UDL) advocates for structuring instruction in flexible, multiple, and diversified ways in order to support all students' access to learning (Center for Applied Special Technology [CAST], 2018), whereas differentiated instruction aims to make instructional adjustments by taking students' readiness levels, interests, and learning profiles into account (Roberts & Inman, 2023). Together, these approaches demonstrate that inclusive learning for gifted students constitutes not merely a pedagogical option but an educational necessity.

New learning contexts emerging through digitalization are also transforming ways of thinking about how inclusive learning can be designed. In this regard, the Metaverse stands out as a pedagogical context that enables the re conceptualization of inclusive learning environments through the interactive, multisensory, and social learning opportunities it offers. The Metaverse is not merely a technological innovation; rather, it is conceived as a learning ecosystem in which instructional adaptations, differentiated learning experiences, and adaptive learning processes can be addressed in a holistic manner (Wang et al., 2022; Yeganeh et al., 2025).

The purpose of this section is to examine, within a theoretical framework, the opportunities that the Metaverse offers for gifted students from the perspective of inclusive learning, and to discuss how these students

can be more effectively supported in inclusive classrooms in line with the responsibility of being the teacher of every child in the classroom. Accordingly, drawing on the fundamental characteristics of inclusive classrooms, the opportunities provided by the Metaverse are addressed from a holistic perspective within the contexts of universal design, differentiated instruction, instructional adaptations, and adaptive learning.

What Makes a Classroom Inclusive?

Inclusive education is a rights based approach that recognizes and addresses the developmental and learning related needs arising from each child's individual characteristics, while also taking their sociocultural backgrounds into account and ensuring their participation in both educational and social contexts. An inclusive classroom is characterized by the following features:

- the provision of instructional processes that respond to students' diverse learning characteristics,
- the creation of an environment in which every child feels a sense of belonging, is valued, and can exist with their own cultural identity,
- the support of each child according to their own learning pace and preferred ways of learning,
- the promotion of students' cognitive, affective, behavioral, and social engagement, and
- the organization of learning environments in which all children can both enjoy themselves and learn together (Yılmaz Atman, 2023).

Within this framework, an inclusive classroom does not merely signify students' presence in the setting or the

provision of physical access; rather, it refers to the structuring of educational processes in ways that enable the meaningful participation of all learners. In inclusive classrooms, teachers adopt pedagogical approaches that are responsive to students' needs, design learning experiences by taking individual differences into account, and support students based on their strengths rather than their perceived deficits (Florian & Spratt, 2013; Woodcock et al., 2022). In particular, differentiated instruction practices stand out as one of the most visible indicators of inclusive education at the classroom level, as they allow the adaptation of content, process, product, and the learning environment according to student characteristics (Ardenlid et al., 2025; Marsili et al., 2025). In this way, students are supported in assuming responsibility for their own learning, while opportunities for learning alongside peers are fostered, thereby strengthening social integration.

Beyond instructional arrangements, the sustainability of an inclusive classroom is also closely linked to the quality of its socioemotional climate. A classroom environment in which mutual respect and acceptance are fostered, and where students feel psychologically safe, enables learners to feel valued, develop a sense of belonging, and participate voluntarily in the learning process (Al Hroub & Jouni, 2023; Ferguson, 2021). When a positive classroom atmosphere is combined with instructional practices based on flexible grouping and meaningful interactions among students, both academic and socioemotional development can be effectively supported (Brigandi et al., 2018; Gilson & Lee, 2023). From this perspective, inclusive classrooms should be understood as relational learning communities in which students feel

safe, individual differences are recognized and valued as sources of enrichment, and learning and enjoyment are experienced collectively (Florian, 2014; Mezzanotte, 2023).

High quality inclusive practices also encompass multidimensional support mechanisms that sustain the longterm implementation of inclusive education. Professional development of school staff constitutes a core element for the effective enactment of inclusive education. Professional learning opportunities supported by a collaborative school culture enhance teachers' competencies as well as their self efficacy perceptions regarding inclusive practices (Lelinge & Alwall, 2022; Robinson & Carrington, 2002). Moreover, strong collaboration among school leaders, families, teachers, and the wider community contributes to the continuity of inclusive practices (Angelides & Antoniou, 2010; Ketikidou & Saiti, 2025). Sustainable planning, effective leadership, and data informed decision support systems further facilitate the strategic use of resources in alignment with inclusive goals (Aryani et al., 2025). In this sense, inclusive education extends beyond ensuring access and represents a sustainable and holistic process of educational transformation.

Supporting Gifted Students in Inclusive Classrooms

Supporting gifted students in inclusive classrooms requires instructional processes to be organized in a flexible and responsive manner that takes learner diversity into account. Universal Design principles enable gifted students to engage in the learning process in ways that align with their developmental and learning characteristics by offering multiple means of

representation, engagement, and expression (Horsley & Friesen, 2025; Olszewski Kubilius et al., 2017). Differentiated instruction, in turn, facilitates the adaptation of teaching processes to the characteristics of gifted learners, thereby supporting learning experiences that are sufficiently challenging, promote higher order thinking, and are meaningfully connected to real life contexts (Tomlinson, 2017).

Adjusting the pace of instruction, in other words regulating instructional tempo, offering students meaningful choices, implementing formative assessment practices, and preventing unnecessary repetition of already mastered content constitute effective instructional adaptations that support both the academic development of gifted students and their opportunities to learn alongside peers (Ardenlid et al., 2025). This approach also provides an important opportunity to respond simultaneously to diverse and sometimes competing needs within inclusive settings, particularly for students who are identified in the literature as twice exceptional, that is, those who demonstrate giftedness while also experiencing at least one area of disability or learning difficulty (Gierczyk & Hornby, 2021).

As previously noted, instructional adaptations and modifications implemented to address the needs of gifted students in inclusive classrooms involve deliberate adjustments across the dimensions of content, process, product, and the learning environment. Teachers support gifted learners by assigning open ended tasks that encourage higher order thinking, providing meaningful choices, adjusting the pace of instruction, and employing content based strategies, problem based learning

approaches, as well as techniques such as problem solving, inquiry, questioning, and bibliotherapy (Ardenlid et al., 2025; Johnsen & Ryser, 1996; VanTassel Baska, 2003). Increasing the depth and complexity of learning content, using flexible grouping practices, offering opportunities for independent study, and designing activities based on students' areas of talent are also among the effective instructional adaptations commonly used in inclusive classrooms (Heacox & Cash, 2020).

In this context, Stepanek (1999) offers several recommendations for supporting gifted students through the use of grouping strategies, which are outlined below:

- when working on open ended problem solving tasks or inquiry based activities in science lessons, heterogeneous grouping is more appropriate,
- during skill development activities or the review of previously learned content, homogeneous grouping is more suitable,
- grouping strategies should remain flexible, and students should be provided with opportunities for independent work in line with their preferences,
- opportunities should be offered for students to select their own groups based on shared interests, and
- for collaborative learning activities to be effective, all students need to develop the skills required to work together.

In addition to grouping strategies, the creation of effective learning environments for gifted students requires instructional arrangements that address core needs such as interest, choice, cognitive challenge, meaning making

in learning content, and enjoyment of learning. In this context, five key concepts that are central to the design of inclusive educational programs and learning environments for gifted students, referred to as respectful tasks, are identified as follows (Gentry & Ferriss, 1999):

- identifying gifted students' areas of interest and supporting these interests within the learning environment (Interest),
- providing gifted students with opportunities to make choices throughout the learning process (Choice),
- cognitively challenging students through advanced content and higher order thinking skills (Challenge),
- engaging students in activities through which they can establish meaningful connections with their own lives and produce outcomes based on these experiences (Personal Meaning), and
- fostering a sense of enjoyment and pleasure throughout the learning process and within the learning environment (Enjoyment).

In this way, while responding to the needs of gifted students within general education classrooms, opportunities are also provided for their social integration. International studies tend to address grouping, acceleration, and enrichment practices in conjunction with inclusive approaches. The effectiveness of these practices largely depends on teachers' professional competencies and the quality of differentiation implemented within the classroom. Moreover, gifted students are able to demonstrate academic growth in inclusive educational settings when a

high quality instructional process is in place; otherwise, they may experience decreased motivation and feelings of frustration (Koh, 2021; Marsili et al., 2025).

In Türkiye, inclusive support practices for gifted students are primarily addressed through resource rooms in general education schools and through Science and Art Centers (BİLSEM), which function as after school enrichment programs (Ağaya & Tan, 2023; Demir, 2024). While the national literature focuses on enrichment based supports, family communication, and teacher education, the international literature more frequently examines equitable identification practices, twice exceptional students, and teachers' competencies related to inclusive instruction (Alodat, 2025; Uysal, 2025). Taken together, these trends indicate that research on supporting gifted students in inclusive classrooms increasingly centers on instructional quality, teacher competencies, and collaboration among key stakeholders.

In recent years, there has been growing interest in the use of immersive and innovative online environments to support gifted students (Avcu, 2025; McKoy & Merry, 2023). The three dimensional, interactive, and flexible learning environments offered by the Metaverse respond effectively to learner diversity by providing multiple means of representation, engagement, and expression, and in this respect demonstrate strong alignment with the principles of UDL (Yeganeh et al., 2025; Zaugg, 2024).

When designed in alignment with the needs of gifted students, Metaverse based learning environments support personalized learning and enable learners to be guided in ways that correspond to their individual learning styles and paces. Moreover, these environments provide rich

opportunities for differentiated instruction tailored to gifted learners. They allow learning approaches and techniques such as inquiry based learning, self directed learning, problem based learning, and the support of creative thinking to be implemented for gifted students without constraints of time or physical space (Avcu & Yaman, 2024; Mulrine, 2007). Through features such as gamification, the integration of artificial intelligence, and opportunities for social interaction, the Metaverse also holds the potential to support an appropriate level of cognitive challenge and social engagement for gifted students (Yeganeh et al., 2025). In this respect, when designed with careful consideration of learner needs, the Metaverse can be conceptualized as a pedagogical tool through which principles of Universal Design and differentiated instruction are effectively enacted for gifted students within inclusive classrooms.

Metaverse and Educational Metaverse

Regarded as the future of internet technology, the Metaverse, also referred to as the "meta universe," is a multilayered ecosystem composed of three dimensional digital worlds in which users can come together synchronously through avatars they select or design themselves. These environments persist even when users disconnect, are open to shared use, and allow active interaction with objects and other individuals within the space (Avcu, 2025). This ecosystem incorporates components such as augmented reality, virtual reality, extended reality, artificial intelligence, cloud computing, and three dimensional design technologies (Park & Kim, 2022). Within the Metaverse, users are not passive recipients who merely consume content; rather, they

function as active agents who can shape the environment, interact with other users, and participate in social, cultural, and economic activities.

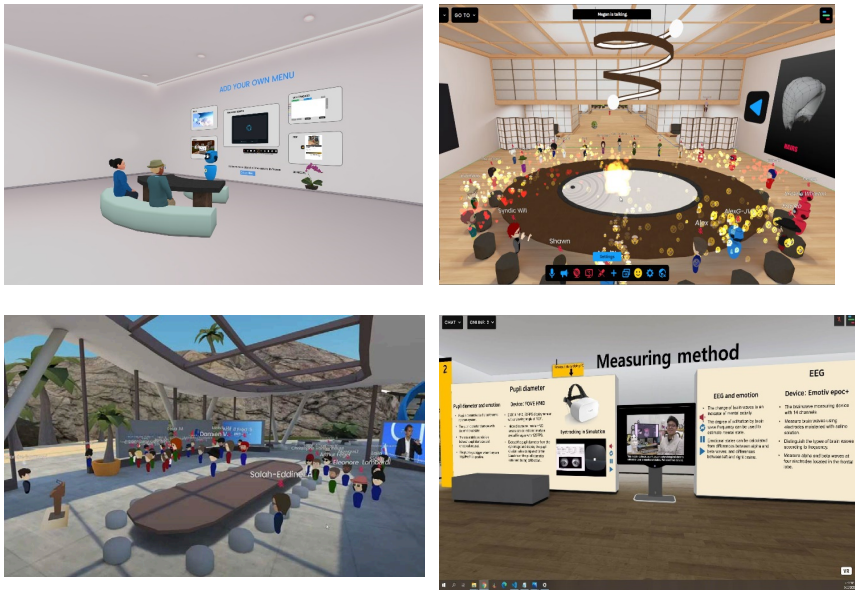
Virtual learning environments that offer immersive and interaction based learning experiences, in which students can interact through their avatars and real life related contexts can be simulated, are referred to as the Educational Metaverse (Göçen, 2022; Onu et al., 2024). Educational Metaverse environments support learners' cognitive, affective, behavioral, and social engagement by providing personalized and adaptive learning pathways. At the same time, they present a pedagogical framework that strengthens collaboration, social interaction among learners, and experiential learning processes (Hwang & Chien, 2024; Ng, 2022). From this perspective, the Metaverse should be understood not merely as a technological innovation, but as an interaction oriented and holistic domain of transformation for the design of learning environments and instructional approaches.

FrameVR.io can be presented as an example of a platform that enables the creation of an inclusive Educational Metaverse through its technical and pedagogical features (FrameVR.io, 2025; McKoy & Merry, 2023, Figure 1). This web based platform operates directly through an internet browser without the need for additional software installation. It offers three dimensional virtual environments that support visual and auditory interaction and allow users, through their avatars, to walk, run, and even fly within the virtual space. Users may also teleport to any desired location within the environment. Teachers or students can create Skyboxes, making it possible for

learners not only to observe the learning environment but also to experience it in embodied and spatial ways. Such learning experiences strengthen students' sense of presence, often described as the feeling of "being there," thereby enhancing engagement and immersion in the learning process.

Figure 1

Educational Metaverse Environment of FrameVR.io (Source: FrameVR.io, 2025).



FrameVR.io offers a range of features, including a shared digital whiteboard, video and image sharing, the ability to import external three dimensional models, and the creation of AI supported three dimensional models within the platform. These affordances make it possible to

generate digital twins of real world spaces, objects, and living entities. Through the Action Editor feature, three dimensional objects can be programmed to respond to specific actions, thereby supporting experiential learning processes in which students interact directly with virtual objects. Within the learning environment, students can express their thoughts and emotions through writing, verbal communication, or the use of three dimensional emojis, enabling multimodal forms of interaction and participation.

FrameVR.io enables teachers to train AI assistants in alignment with learning objectives by using text, video, and website links. Students can interact with these AI assistants through spoken or written communication. Within the platform, three dimensional objects and visuals can also be generated through AI supported prompt based creation. In line with formative assessment practices, teachers can administer surveys designed for students and provide immediate feedback. Through learning analytics, students' levels of participation, interaction patterns, and collaboration processes can be systematically monitored. In this way, process oriented assessment and pedagogical adaptations are effectively supported.

In summary, FrameVR.io functions as a pedagogically oriented Educational Metaverse platform that simultaneously supports cognitive, affective, behavioral, and social engagement, offering a human centered and inclusive Educational Metaverse environment (FrameVR.io, 2025).

Educational Metaverse Design and Gifted Students

Zhang et al. (2025) emphasize the following criteria regarding how the Educational Metaverse should be designed:

1) The Educational Metaverse should place social interaction at its core.
2) The Educational Metaverse should move beyond observation based experiences and be grounded in movement, exploration, and experiential engagement, incorporating visual, auditory, and interactive elements.
3) The Educational Metaverse should include simulations of the real world, capture students' attention, facilitate deep learning, and support the meaningful connection of knowledge with real life contexts.
4) Within the Educational Metaverse, students and teachers should be able to organize, transform, and redesign the learning environment, as well as create their own learning scenarios.
5) Avatars in the Educational Metaverse should be conceptualized as tools through which students can express their identities, assume different roles, and participate in learning processes while feeling psychologically safe.
6) The Educational Metaverse should allow individual, small group, and whole group activities to be designed and implemented within the same environment, providing flexibility for the use of diverse instructional approaches.
7) Real time interaction and high quality content constitute essential components of the Educational Metaverse. The immediate

recognition of user actions and the visual, auditory, interactive, and pedagogical quality of learning materials strengthen students' sense of presence in virtual environments.

8) The Educational Metaverse should be designed with a pedagogical rather than a purely technological focus.

Yeganeh et al. (2025) criticize Educational Metaverse designs that focus on a single feature, such as the use of simulation or gamification alone, arguing that such approaches lead to fragmented and superficial learning experiences. In response to this limitation, they propose the Meta MILE Model (Metaverse driven Multi layered Immersive Learning Environment). Meta MILE is a five layered ecosystem that concretizes the inclusive classroom perspective within the Metaverse context. These layers can be outlined as follows:

- Layer 1 – Infrastructure Layer
- Layer 2 – Content and Interaction Layer
- Layer 3 – Personalization and Accessibility Layer
- Layer 4 – Collaboration and Social Engagement
- Layer 5 – Assessment and Feedback Layer

In a Metaverse based science classroom where the theme of climate change and sustainable living is addressed, the infrastructure layer, as the first level of inclusive participation, refers to the technical foundation that enables students to access the same three dimensional virtual environment seamlessly through different devices such as VR headsets, tablets, or computers. The second layer, the content and interaction layer, allows students to explore a virtual ecosystem through their avatars, experience subject related concepts such as the carbon

cycle, conduct experiments, and manipulate environmental variables, thereby supporting experiential learning.

The third layer, the personalization and accessibility layer, adjusts the density of content and the level of instructional support according to students' learning pace, language proficiency, interests, readiness levels, or more broadly, their special educational needs. In this way, equitable learning opportunities are provided for all learners within an inclusive classroom. The fourth layer, the collaboration and social engagement layer, enables students with diverse learning profiles to work in small groups to design solutions to environmental problems, generate ideas on shared digital boards, and engage in peer interaction. Through these processes, cognitive, affective, behavioral, and social engagement, as well as a sense of belonging, are strengthened.

The final layer, the assessment and feedback layer, adopts scenario based and process oriented assessment approaches to holistically monitor not only students' acquisition of content knowledge but also their problem solving, collaboration, and decision making skills. When this example is reconsidered as a whole, it becomes evident that the Meta MILE model represents a pedagogical framework that takes the core characteristics of inclusive classrooms into account and provides valuable guidance for the design of Educational Metaverse environments.

Although Meta-MILE was not developed exclusively for gifted students, its multi layered and flexible structure proposes a pedagogical framework that closely aligns with the learning needs of gifted learners. Gifted students

typically require opportunities to progress at their own pace, engage with complex problem situations, work with content characterized by depth and complexity, and experience differentiated learning pathways tailored to their readiness levels, learning profiles, and interests.

Within this framework, the infrastructure layer of Meta-MILE can support gifted students' needs for self directed and location independent learning through cross platform compatibility and flexible access options. The content and interaction layer, through content manipulation, virtual experiments, and three dimensional simulations, enables the in depth exploration of abstract and complex concepts and facilitates a deeper understanding of the relationships among these concepts.

The personalization and accessibility layer of the model can adapt both the intensity of the content and the complexity of learning tasks according to gifted students' learning pace and readiness levels, while also taking their interests into account. The collaboration and social engagement layer can further enhance gifted students' opportunities to share their abilities and ideas, develop communication with peers, and experience leadership roles through problem based and creativity focused group work. Finally, within the assessment and feedback layer, process oriented and scenario based assessment approaches allow for the holistic monitoring of not only students' academic achievement but also their higher order thinking and social skills.

The holistic structure of the Meta-MILE model offers a strong framework that enables gifted students to move beyond being passive consumers of information and to become learners who actively generate, design, and

critically question knowledge. From this perspective, the model is considered to directly support the learner roles defined within the International Society for Technology in Education Learner Standards, namely Empowered Learner, Innovative Designer, Creative Communicator, and Global Collaborator (ISTE, 2016; 2022). Accordingly, Meta-MILE can be regarded as a pedagogically grounded Educational Metaverse model that is aligned with contemporary standards and has strong potential for fostering gifted students' twenty first century skills.

Universal Design for Learning (UDL), the Metaverse, and Gifted Students

Universal Design for Learning (UDL) is an inclusive approach that conceptualizes individual differences among learners not as exceptions, but as a starting point for the design of learning environments. UDL aims to ensure the equitable and meaningful participation of students with diverse cognitive, affective, behavioral, and social profiles in learning processes. In this respect, it provides an important theoretical framework for addressing the educational needs of gifted students who are educated both in heterogeneous general education classrooms and in relatively homogeneous settings such as Science and Art Centers (BİLSEM).

The core principles of UDL are organized around three main dimensions (Center for Applied Special Technology, 2018):

- Multiple means of representation,
- Multiple means of action and expression, and
- Multiple means of engagement.

These three dimensions emphasize that learning should be supported not only at the cognitive level but also through auditory, visual, tactile, affective, and technological components. In non inclusive environments, gifted students are often exposed to uniform instructional practices, which may overlook their learning pace and cognitive needs, thereby constraining the realization of their potential. From this perspective, UDL can be regarded not only as an inclusive approach for gifted students but also as a pedagogical framework that offers enriched and developmentally responsive learning opportunities.

When Educational Metaverse environments are intentionally designed in ways that respond to the needs of gifted students, as discussed earlier with reference to the Meta-MILE model, the principles of Universal Design for Learning can be operationalized in a functional and meaningful manner for this population. Gargiulo and Metcalf (2021) note that a wide range of auditory, visual, tactile, affective, and technological alternatives can be employed to provide multiple means of representation, action and expression, and engagement. Reconsidered within the context of the Metaverse, multiple means of representation can be supported through three dimensional visuals, interactive models, auditory explanations, and simulations.

With regard to multiple means of action and expression, gifted students can demonstrate their learning not only through written examinations but also through three dimensional designs, virtual prototypes, digital stories, avatar mediated presentations, and diverse problem solving scenarios. In this way, Metaverse based learning

environments not only allow students to express their understanding through varied modalities but also actively foster gifted students' creative thinking and higher order cognitive skills.

The third dimension of UDL, multiple means of engagement, is particularly aligned with gifted students' motivation and search for meaning in learning. Metaverse environments that take multiple means of engagement into account can support gifted students' affective engagement through role playing, exploration, problem based learning, and social interactions. According to Gargiulo and Metcalf (2021), learning activities that are designed without considering what students are curious about (interest), the degree to which they have agency in the learning process (autonomy), and the extent to which tasks provide an appropriate level of challenge are unlikely to sustain students' long term and voluntary engagement in learning (Rogers, 2007). When gifted students are able to participate fully in learning environments, experiences such as boredom and loss of motivation tend to decrease, while the likelihood of learning becoming a meaningful and transformative experience increases.

By integrating UDL's multiple means of representation, action and expression, and engagement within a single learning environment, the Metaverse offers a learning context that is both inclusive and enriching for gifted students. In this sense, the Metaverse enables the simultaneous enactment of UDL principles in ways that respond to gifted learners' cognitive, affective, and motivational characteristics. Table 1 presents the instructional alternatives that emerge from reinterpreting

the three core dimensions of UDL within the Metaverse context, specifically with regard to the educational needs and learning profiles of gifted students.

Table 1

The Three Core Dimensions of UDL in the Metaverse Context and Instructional Alternatives for Gifted Students

Dimension	Multiple Means of Representation	Multiple Means of Action and Expression	Multiple Means of Engagement
Auditory	Audio based explanations, avatar dialogues, environmental sounds, scenario based narration	Oral explanations, avatar mediated presentations, audio reports	Audio prompts initiating discussion, verbal interaction with peers
Visual	Three dimensional models, simulations, animations, dynamic data visualizations	Visual presentations, digital posters, three dimensional designs	Exploration based visual tasks, observation and analysis activities
Tactile / Embodied	Movement within virtual space, grasping and transporting objects, manipulating variables	Creating virtual prototypes, constructing experimental setups	Manipulating three dimensional models, virtual manipulatives, gamified tasks, integrating movement

			such as walking, running, and object interaction into learning activities
Affective	Engaging contextual scenarios, environments connected to real life contexts	Expressing emotions through avatars, three dimensional emojis, or digital storytelling	Individual, peer, and collaborative group work; task structures supporting self regulation; formative feedback provided throughout the process
Technological	Multimedia content, AI supported explanations, interactive systems	Digital product development, virtual modeling, technology based production	Gamified digital tasks, learning pathways that offer choice and learner autonomy

Note. Adapted from Gargiulo and Metcalf (2021).

Differentiated Instruction, the Metaverse, and Gifted Students

UDL and differentiated instruction are complementary approaches that share common principles regarding the organization of inclusive learning environments and the structuring of instructional processes. UDL emphasizes designing learning environments from the outset to be

flexible and accessible, thereby offering multiple means of representation, action and expression, and engagement for all learners. Differentiated instruction, in turn, enables the adaptation of content, process, product, and the learning environment within the flexible structure provided by UDL, based on students' readiness levels, interests, and learning profiles.

Among differentiated instruction models developed for gifted students, the Maker Differentiation Model demonstrates strong theoretical alignment with UDL. Developed by Maker (1982), the model proposes differentiation across four dimensions of instruction: content, process, product, and the learning environment (Maker, 1982; Maker & Nielson, 1995; Maker & Schiever, 2010). Within this framework, instruction is differentiated holistically through content that emphasizes depth, abstraction, and conceptual complexity within and across disciplines; processes that involve higher order thinking, inquiry based learning, and flexible pathways of progression; products that focus on real world problems and allow for creative expression through original outcomes; and learning environments that support flexibility, autonomy, and collaboration at both physical and psychological levels (Maker & Schiever, 2010).

As discussed earlier, the Meta-MILE model conceptualizes Metaverse based learning environments as a five layered structure (Yeganeh et al., 2025). From this perspective, it can be argued that the structural dimensions of the Maker Model can be systematically enacted within the Metaverse context through the layered architecture of the Meta-MILE framework.

The infrastructure layer of the Meta-MILE model constitutes the foundational structure that supports the learning environment dimension of the Maker model. Through cross-platform compatibility, spatial flexibility, and accessible entry points, this layer enables gifted students to participate in learning processes in an independent and secure manner. According to Maker (1982), the learning environment should be flexible and designed to foster student autonomy. In alignment with this view, the infrastructure layer of Meta-MILE conceptualizes the learning environment not merely as a physical space, but as a dynamic context that responds to students' cognitive and affective needs.

The content and interaction layer of the Meta-MILE model can be directly associated with the content and process differentiation dimensions of the Maker Model. For gifted students, instructional content should embody depth, complexity, and abstraction (Maker & Schiever, 2010). These qualities can be addressed through three dimensional simulations, multiple representations, and interactive, manipulable objects. At the same time, process differentiation is supported through experiential learning pathways that actively engage students in research, inquiry, and problem solving, allowing them to progress at their own learning pace (Maker & Nielson, 1995).

The personalization and accessibility layer of the Meta-MILE model supports all dimensions of the Maker Model. Within the functioning of this layer, the depth of content, the complexity of tasks, and the pace of learning can be adapted in accordance with students' individual characteristics. The collaboration and social engagement

layer of the Meta-MILE model further deepens the learning environment and process differentiation dimensions of the Maker Model by embedding them within a social context. In Metaverse environments, small group activities, shared problem solving spaces, and co-creation tools enable students to collaboratively produce knowledge, thereby supporting the development of critical thinking, creative thinking, communication, and leadership skills. At the same time, these experiences contribute to a stronger sense of belonging.

Finally, the assessment and feedback layer of the Meta-MILE model strengthens the product differentiation dimension of the Maker Model through a process oriented approach. Learning outcomes can be evaluated not only in terms of content mastery, but also with regard to creativity, problem solving, and connections to real world contexts. Through scenario based and authentic assessment practices, the Meta-MILE model allows for the systematic monitoring of students' decision making, innovation, and self regulated learning skills.

Conclusion and Recommendations

In this section, the potential of the Metaverse for gifted students has been examined from the perspective of inclusive learning. This potential has been discussed in relation to inclusive classroom principles, UDL, and differentiated instruction approaches. The theoretical framework presented demonstrates that inclusivity for gifted students cannot be reduced to mere access or physical presence within the same learning environment. Rather, inclusivity becomes meaningful through high quality learning experiences that respond to needs such as cognitive depth and an appropriate level of challenge. In

addition, a balanced integration of acceleration and enrichment, socioemotional safety, and meaningful peer interaction constitutes an essential part of these experiences.

Within this context, the Metaverse integrates multiple means of representation, action and expression, and engagement within a single ecosystem. It supports interactive and experiential learning, facilitates collaboration, and offers personalized learning pathways. These characteristics provide a suitable context for the functional enactment of UDL principles. When the multilayered structure of the Meta-MILE model is considered alongside the content, process, product, and learning environment dimensions of the Maker Model, it becomes evident that Metaverse designs should move beyond a technology driven focus and instead be grounded in pedagogical principles aligned with differentiation. Moreover, such designs should be structured as holistic systems in which assessment and evaluation are embedded within the learning process.

From an implementation perspective, the effectiveness of Metaverse based learning environments for gifted students depends on several key considerations: the intentional planning of UDL's multiple options framework for representation, expression, and engagement within instructional designs; the development of content characterized by depth, abstraction, and conceptual complexity, inquiry based processes, authentic and creative products, and flexible, psychologically safe learning climates in line with the Maker Model; and the systematic integration of personalization, accessibility, collaboration, and process

oriented feedback in alignment with the Meta-MILE layers. Accordingly, teacher education and professional development programs should address Metaverse pedagogy, UDL, and differentiated instruction competencies in an integrated manner. Furthermore, platform selection should take into account not only technical features, but also learning analytics, accessibility options, production tools, and assessment affordances.

Future research is encouraged to expand design based and mixed methods studies examining how gifted students are affected in Metaverse environments across cognitive dimensions such as deep learning and higher order thinking, affective dimensions such as belonging and motivation, social dimensions such as collaboration and peer interaction, and self regulation. In addition, it is recommended that future studies investigate the effectiveness of accessibility and adaptation components in Metaverse based learning environments, particularly for twice exceptional students.

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CHAPTER 3

TEACHER ROLES, INSTRUCTIONAL STRATEGIES, AND DIFFERENTIATION FOR GIFTED LEARNERS

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Introduction

Contemporary educational philosophy recognizes that every student is unique and possesses distinct learning needs. This understanding necessitates the continuous evolution of teacher roles and the instructional strategies they employ. When it comes to educating gifted students in particular, it becomes essential to move beyond traditional teaching approaches and adopt research-based, individualized methodologies. In the rapidly changing landscape of the twenty-first century, enabling gifted individuals to realize their potential and contribute meaningfully to society stands as one of the primary objectives of educational systems.

One of the fundamental goals of education is to allow each student to reach their full individual potential. This aim, especially when gifted learners are involved, calls for a thorough reconsideration of the roles teachers must assume and the strategies they need to implement. With the growing emphasis on inclusive education, the practice of educating gifted students alongside their peers in general education classrooms has become increasingly prevalent. This situation places greater responsibility on classroom teachers to address the distinctive learning needs of gifted students.

The concept of giftedness has undergone significant transformations throughout history. While the traditional view regarded giftedness as a fixed trait measured solely through cognitive assessments, contemporary perspectives recognize it as a dynamic and socially constructed quality that can manifest across multiple domains (Renzulli, 2005). Renzulli's Three-Ring Conception defines giftedness as the intersection of

above-average ability, creativity, and task commitment, emphasizing that these characteristics may emerge under specific conditions. This paradigm shift directly influences how teachers identify and support gifted students.

Educating gifted students in inclusive classrooms presents teachers with unique challenges and opportunities. On one hand, there is the need to address the requirements of all learners within a heterogeneous class structure; on the other, it becomes necessary to develop specialized strategies for advancing the higher-order cognitive abilities of gifted students and keeping them motivated. Research has demonstrated that gifted students experience motivational decline and may even underachieve in learning environments that are not appropriately tailored to their needs (Reis & McCoach, 2000). Consequently, the effective implementation of differentiated instructional strategies by teachers is of critical importance.

This chapter comprehensively examines the roles of teachers working with gifted students in inclusive educational settings, effective instructional strategies, and approaches to curriculum differentiation. First, the conceptual framework of teacher roles and their significance in gifted education will be discussed. Subsequently, core instructional strategies such as enrichment, acceleration, and curriculum compacting will be analyzed based on research findings. Finally, differentiation practices across the dimensions of content, process, product, and learning environment will be illustrated with concrete examples.

Characteristics and Educational Needs of Gifted Students

Effective education of gifted students requires a comprehensive understanding of their distinguishing characteristics and the educational needs that arise from them. The concept of giftedness extends beyond a unidimensional construct, encompassing a broad spectrum that includes multiple intelligences, creativity, leadership abilities, and specific academic talents. Gardner's (1983) theory of multiple intelligences underscores that giftedness is not confined to traditional academic intelligence but may also manifest in areas such as musical, bodily-kinesthetic, interpersonal, and naturalistic intelligence.

Gifted students display cognitive characteristics such as faster learning, abstract thinking, deep curiosity, intense interests, and strong memory compared to their peers (Clark, 2008). While these students typically demonstrate superior abilities in grasping complex ideas, they may experience motivational decline when faced with routine and repetitive tasks.

In addition to cognitive characteristics, the socio-emotional development of gifted students warrants special attention. These students frequently exhibit traits such as perfectionism, heightened sensitivity, and emotional intensity. The concept of "asynchronous development," described by Silverman (2002), indicates that the cognitive development of gifted children may outpace their emotional and social development. This situation can create challenges regarding peer relationships and behavioral adjustment in the classroom setting.

The primary educational needs of gifted students include intellectual stimulation, appropriately challenging tasks, opportunities for autonomy, and chances to explore their areas of interest. Vygotsky's (1978) concept of the zone of proximal development explains that these students achieve optimal learning when presented with content slightly above their current competency level. Similarly, Csikszentmihalyi's (1990) flow theory demonstrates that the optimal balance between challenge and skill level increases learning motivation and engagement.

Because traditional classroom environments are typically designed for average-level students, they often fall short in meeting the needs of gifted learners. Research indicates that in regular classroom settings, gifted students spend a significant portion of their time waiting for material they have already mastered (Reis et al., 1993). This situation can lead to boredom, loss of motivation, and even behavioral problems. Therefore, it is of great importance that teachers understand the unique learning profiles of these students and develop appropriate interventions.

Teacher Roles in Inclusive Education

Within the context of inclusive education, teachers assume multidimensional and dynamic roles that extend far beyond the traditional role of knowledge transmitter. Being an effective teacher in the twenty-first century requires not only subject matter expertise but also pedagogical competence, empathy, flexibility, and a commitment to continuous learning. As noted in UNESCO's (2020) report on inclusive education, educational systems that support all students in realizing their potential rely on qualified and well-prepared teachers.

The roles that teachers must assume when working with gifted students extend beyond general classroom teaching competencies. Specialized knowledge and skills are required to address the unique cognitive, social, and emotional needs of these students. Research consistently demonstrates that teachers who have received training in gifted education implement more effective differentiation practices and positively influence student outcomes.

The essential roles that teachers should undertake in educating gifted students can be categorized as diagnostician, facilitator, counselor, mentor, and advocate.

The Diagnostician Role

The teacher's role in identifying gifted students and determining their strengths, interests, and learning styles forms the foundation of effective differentiation. This role encompasses not only participation in formal identification processes but also discovering potential through classroom observations, formative assessments, and ongoing monitoring of student performance. Research indicates that teachers who have received training in identification are more likely to accurately identify gifted students (Akar, 2020).

Effective fulfillment of the diagnostician role requires teachers to understand the multidimensional nature of giftedness. Giftedness is not limited to academic achievement; it may also manifest in areas such as creativity, leadership, artistic talents, and psychomotor abilities. Teachers should comprehensively assess student strengths using various evaluation tools and observation techniques. The Total Talent Portfolio developed by

Renzulli and Reis (2014) provides an effective instrument for systematically documenting students' talent areas, interests, learning styles, and expression preferences.

The Facilitator Role

In the facilitator role, rather than serving as a direct transmitter of knowledge, the teacher functions as a guide who directs and supports the learning process. This role encompasses creating student-centered learning environments, encouraging students to take responsibility for their own learning, and implementing inquiry-based instructional approaches.

Teachers working with gifted students should help these learners develop independent study skills. Self-directed learning plays a critical role in enabling gifted students to realize their academic potential (Housand & Reis, 2009). Teachers can contribute to students becoming lifelong learners by teaching them strategies for goal setting, time management, resource finding, and self-assessment.

The Counselor and Mentor Role

Teachers fulfill an important function as counselors and mentors in supporting the academic and socio-emotional development of gifted students. This role includes supporting students' career exploration, directing them toward advanced learning opportunities, and helping them overcome socio-emotional challenges.

Due to their asynchronous development, gifted students may experience social and emotional experiences that differ from their peers. Teachers can guide these students in understanding themselves, discovering their strengths, and exploring potential careers. Additionally, by utilizing

community resources and field experts, teachers can connect students with real-world mentorship opportunities.

The Advocate Role

Teachers also assume a critical role as advocates for the educational needs of gifted students. This role encompasses collaborating with school administration and families to secure appropriate resources, supporting practices such as flexible grouping and acceleration, and emphasizing the importance of gifted education.

The advocacy role also involves addressing misconceptions about gifted students. Contrary to common myths that gifted students "can take care of themselves" or "don't need extra support," these students also require appropriately challenging and supportive learning experiences (Reis & Peters, 2021). Teachers can advocate for the value of gifted education by sharing these realities with stakeholders.

Instructional Strategies: Enrichment, Acceleration, and Curriculum Compacting

Three core strategies commonly employed in gifted education are enrichment, acceleration, and curriculum compacting. These strategies are complementary in nature and can be flexibly implemented according to the individual needs of students.

Enrichment

Enrichment aims to provide students with more comprehensive and meaningful learning experiences through deepening and extending the standard

curriculum. Enrichment activities enable students to explore topics in greater depth beyond the regular curriculum, establish interdisciplinary connections, and engage with real-world problems. This strategy is regarded as an effective approach for meeting the needs of gifted students, particularly in inclusive classroom environments.

Enrichment activities should not be random or unplanned. Effective enrichment should offer experiences that are aligned with instructional objectives, based on student interests and abilities, and systematically planned. Kaplan's (1992) dimensions of depth and complexity provide a useful framework for enrichment planning. These dimensions encourage students to examine topics from different perspectives, analyze changes over time, evaluate ethical dimensions, and establish interdisciplinary connections.

The Schoolwide Enrichment Model (SEM), developed by Renzulli and Reis (1985, 2014), offers a systematic framework for enrichment practices. This model is implemented in thousands of schools worldwide and provides enrichment opportunities that benefit both gifted students and all learners. The model defines three types of enrichment activities:

Type I Enrichment: Referred to as general exploratory experiences, these activities aim to expose students to new and varied topics, ideas, and fields. Guest speakers, field trips, exhibitions, and multimedia presentations exemplify this category.

Type II Enrichment: Defined as group training activities, these aim to develop higher-order thinking

skills such as critical thinking, creative problem-solving, research skills, and communication abilities.

Type III Enrichment: Characterized as individual or small-group investigations of real problems, these activities involve students developing original projects in their areas of interest and sharing these projects with authentic audiences. These activities encourage students to think, feel, and produce like professionals.

Research demonstrates that the Schoolwide Enrichment Model produces effective outcomes in schools across various socioeconomic levels (Reis & Peters, 2021). The model offers enrichment opportunities from which both gifted students and all learners can benefit.

Acceleration

Acceleration encompasses strategies that provide students with content or experiences more advanced than their age-determined level. Acceleration is recognized as one of the best-supported interventions in gifted education (Colangelo, Assouline, & Gross, 2004).

Acceleration strategies can be implemented in various forms, including early school entrance, grade skipping, subject-based acceleration, advanced placement examinations, and dual enrollment programs. Determining which acceleration option is appropriate for each student should involve individual assessment and decision-making processes.

Research on acceleration consistently demonstrates that this strategy has strong positive effects on academic achievement and does not negatively impact socio-emotional development (Bernstein, Lubinski, & Benbow,

2021). A 35-year longitudinal study revealed that academic acceleration does not adversely affect the psychological well-being of gifted students; rather, it positively supports their academic and career success.

Curriculum Compacting

Curriculum compacting is a systematic procedure that allows gifted students to skip content they have already mastered and dedicate time to more challenging and meaningful learning experiences. This strategy has been extensively documented and researched by Reis, Renzulli, and Burns (2016).

The curriculum compacting process consists of three fundamental steps: First, identifying the objectives—defining the essential content and skills the student needs to learn. Second, pre-assessment—determining the extent to which the student has already acquired this content and skills. Third, providing alternative activities—offering enrichment or acceleration opportunities in areas where time has been saved.

Research reveals that students who undergo curriculum compacting do not experience declining academic achievement; on the contrary, they demonstrate higher motivation and engagement (Reis et al., 1998). This strategy enables teachers to implement differentiated instruction in a practical manner.

Differentiated Instruction: Theoretical Foundations and Implementation Principles

Differentiated instruction is defined as the adaptation of content, process, and product in accordance with students' individual readiness levels, interests, and learning

profiles (Tomlinson, 2017). This approach is grounded in the fundamental assumption that each student is unique and that learning needs vary. Differentiation is recognized not merely as an instructional technique but as a pedagogical philosophy that values student diversity and supports each student in realizing their potential.

The foundations of differentiated instruction rest upon various learning theories. Vygotsky's (1978) concept of the zone of proximal development emphasizes that students achieve optimal learning when presented with content slightly above their current developmental level. This concept provides the theoretical basis for differentiation's focus on student readiness. Similarly, Gardner's (1983) theory of multiple intelligences supports the notion that students possess different learning profiles and that instructional approaches aligned with these profiles yield more effective outcomes.

Effective implementation of differentiated instruction requires teachers to adopt proactive, quality-focused, and multifaceted approaches. Tomlinson (2017) emphasizes that differentiation should be pre-planned, of high quality, and executed across multiple levels in the dimensions of content, process, and product. This approach requires teachers to view student diversity not as a challenge but as a source of richness.

Tomlinson's Differentiation Model

Carol Ann Tomlinson's differentiation model provides a widely used framework in gifted education. According to this model, teachers can differentiate four fundamental elements: content, process, product, and learning environment.

Content differentiation involves presenting the knowledge, concepts, and skills that students need to learn at varying levels. For gifted students, content differentiation encompasses presenting more complex concepts, deeper inquiries, and interdisciplinary connections.

Process differentiation refers to varying the ways in which students process and make meaning of content. This includes providing different instructional strategies, activities, and support. Gifted students typically benefit from less structured, open-ended, and problem-solving-focused activities.

Product differentiation encompasses varying the ways in which students demonstrate their learning. Gifted students should be provided opportunities to create original and creative products that address real-world audiences.

Learning environment differentiation involves organizing the physical and emotional learning environment according to student needs. Flexible seating arrangements, quiet work areas, collaboration corners, and resource centers exemplify this type of differentiation.

VanTassel-Baska's Integrated Curriculum Model

The Integrated Curriculum Model (ICM), developed by Joyce VanTassel-Baska, provides a comprehensive approach to curriculum design for gifted students (VanTassel-Baska, 1986, 2021). This model proposes the integration of three fundamental dimensions:

The advanced content dimension ensures that students encounter accelerated or more complex content. This dimension allows students to work with content beyond their age level and develop a deeper understanding of core concepts.

The process-product dimension emphasizes the development of research and inquiry skills and the creation of high-quality products. This dimension encourages students to think and work like scientists and experts.

The conceptual theme dimension involves the exploration of interdisciplinary big ideas and concepts. Macro concepts such as change, systems, models, and power facilitate connections across different fields and subjects.

Research demonstrates that curricula designed using the Integrated Curriculum Model create meaningful differences in gifted student learning (VanTassel-Baska & Little, 2011).

Development of Higher-Order Thinking Skills

For gifted students to realize their potential, higher-order thinking skills must be systematically developed. Bloom's Revised Taxonomy provides a widely used framework for classifying and teaching these skills (Anderson & Krathwohl, 2001).

Bloom's Taxonomy and Gifted Education

Bloom's taxonomy classifies cognitive skills into six levels: remembering, understanding, applying, analyzing, evaluating, and creating. The upper three levels—

analyzing, evaluating, and creating—are considered higher-order thinking skills and are particularly emphasized in gifted education.

While traditional classroom instruction often focuses on lower-level skills (remembering and understanding), the cognitive abilities of gifted students require more intensive attention to higher-order skills. Research indicates that when teachers receive training in asking higher-order questions, motivation and engagement increase among both gifted and other students (Sypré et al., 2025).

Critical Thinking and Problem Solving

Critical thinking encompasses the ability to analyze and evaluate information and draw conclusions. While gifted students typically possess potential for critical thinking, this skill requires systematic development.

Problem-solving skills are developed through work on open-ended and real-world problems. Problem-based learning provides gifted students with opportunities to analyze complex problems, develop solution strategies, and evaluate their outcomes.

Creativity and Innovation

Creativity is an essential component of giftedness and an area that requires particular support during the educational process. Developing the creative potential of gifted students necessitates providing opportunities for generating original ideas, taking risks, and creating innovative products.

Teachers should create a safe atmosphere in the classroom to support creativity, encourage diverse ideas, and value students' original work. Furthermore, it should be emphasized that creativity is not limited to art classes but can be developed across all disciplines (Renzulli, 2016).

Flexible Grouping Strategies

Flexible grouping involves bringing students together in temporary groups based on specific learning objectives, interests, or readiness levels. This strategy offers an effective approach for meeting the needs of gifted students in inclusive classrooms.

Cluster Grouping

Cluster grouping involves placing four to ten gifted students of the same grade level into a heterogeneous classroom. This practice enables the teacher to implement differentiation more effectively while allowing gifted students to interact with both peers of similar ability and students of varying abilities (Gentry, 2018).

Research indicates that cluster grouping positively affects the academic and socio-emotional development of gifted students. This practice also contributes to the development of teachers' differentiation skills.

Ability-Based and Interest-Based Grouping

Ability-based grouping involves bringing students at similar readiness levels together for specific skill development activities. This type of grouping should be flexible and may vary according to students' proficiency levels in different areas.

Interest-based grouping enables students with common interests to come together for project and research work. This approach increases student motivation and develops collaborative learning skills.

The Balance of Heterogeneous and Homogeneous Grouping

Research indicates that different grouping strategies are more suitable for different learning objectives. While heterogeneous groups may be more effective for open-ended problem-solving and inquiry activities, homogeneous groups may be more appropriate for skill development activities. Teachers should employ flexible grouping strategies based on learning objectives.

Teacher Professional Development and Competencies

Effective education of gifted students requires teachers to possess specialized competencies in this field. Research demonstrates that professional development opportunities in gifted education positively influence both teacher competencies and student outcomes.

Core Teacher Competencies

Akar (2020) conducted comprehensive research on the competencies classroom teachers need to support gifted students. According to this study, core competencies can be classified in the following categories:

Knowledge competencies: Knowledge about the nature of giftedness, identification methods, instructional strategies, and program models.

Pedagogical competencies: Skills in differentiated instruction, flexible grouping, assessment, and individualized instructional planning.

Personal competencies: Flexibility, creativity, patience, empathy, and a commitment to continuous learning.

Communication competencies: Effective collaboration and communication skills with families, specialists, and other teachers.

Professional Development Programs

Effective professional development programs should provide teachers with comprehensive training on the characteristics of gifted students, differentiation strategies, and implementation methods. These programs should include application opportunities, mentorship, and ongoing support in addition to theoretical knowledge.

Research indicates that collaborative professional development approaches are particularly effective. Collaboration between gifted education specialists and classroom teachers enhances both student learning and teacher competencies (Mofield, 2020).

Technology Integration

Technology can serve as a powerful tool in gifted education. Digital tools and resources can be used to support differentiated instruction, personalize learning experiences, and provide students with access to advanced content.

Technology for Personalizing Learning

Adaptive learning platforms present content according to students' individual levels, enabling them to progress at their own pace. These platforms can identify students' strengths and weaknesses and provide content at appropriate challenge levels.

Online resources and virtual learning environments enable gifted students to access advanced content that may not be available in the classroom setting. Virtual courses, online programs, and digital libraries allow students to explore their areas of interest.

Technology for Creative Production

Digital tools support gifted students in creating creative and original products. Tools such as video editing, animation, coding, web design, and multimedia production enable students to express their learning in innovative ways.

Assessment and Monitoring

Monitoring and assessing the development of gifted students is critically important for effective instruction. Assessment should be used to determine students' starting points, track progress, and evaluate instructional effectiveness.

Pre-Assessment

Pre-assessment is used to determine what students already know before beginning a unit or topic. This assessment provides the foundation for curriculum compacting and differentiation decisions. Pre-tests,

concept maps, and discussions can serve as pre-assessment tools.

Formative Assessment

Formative assessment involves continuous monitoring of the learning process. Observations, checkpoints, draft work, and student self-assessments fall into this category. This type of assessment enables teachers to adjust their instruction according to student needs.

Summative Assessment

Summative assessment involves evaluating student achievement at the end of a learning period. For gifted students, summative assessment should go beyond traditional tests to include performance tasks, portfolios, and real-world projects.

Gifted Education in the Turkish Context

In Türkiye, the education of gifted students has developed a certain institutional structure and level of awareness over the past thirty years. During this period, Science and Art Centers (BİLSEM) have served an important function in the identification and support of gifted students. Enrichment-based programs conducted outside of regular school hours aim to develop the academic, artistic, and scientific potential of these students. However, the limited capacity of these centers and their ability to reach only a specific number of students indicates that a large proportion of gifted students continue to receive their education in general education classrooms. This situation makes the importance of differentiated instruction in inclusive classroom settings even more apparent.

Research conducted at Science and Art Centers has also revealed that the success of gifted students cannot be explained by a single variable; multidimensional factors such as family, study habits, motivation, and technology use must be considered together. Indeed, Bakır and Öngenli (2025), in their study examining factors affecting the mathematics achievement of gifted students enrolled in these centers, emphasized that these variables are related to success. This finding serves as a reminder that in-school support should not be limited solely to curriculum acceleration but should adopt a holistic approach encompassing students' learning behaviors, learning motivation, and access to learning resources.

When the current educational structure in Türkiye is examined, it can be observed that support for gifted students largely relies on supplementary programs and institutions, while systematic practices for these students in general education classrooms remain limited. Yet the continuity of gifted students' cognitive and socio-emotional development requires a support approach that extends throughout all school learning processes, not limited to specific days and hours. At this point, classroom teachers assume a determining position in the education of gifted students.

Teachers working in general education classrooms typically work with heterogeneous student groups and must simultaneously address the needs of students with different learning paces, interests, and readiness levels. This situation can lead to insufficiently challenging learning experiences for gifted students and, at times, loss of motivation. One of the primary reasons for this problem in the Turkish context is the limited attention

given to gifted education in teacher preparation programs and the insufficient availability of in-service training opportunities. A significant portion of teachers, even when theoretically familiar with differentiated instruction, do not feel competent in how to reflect this knowledge in classroom practice.

In this context, the education of gifted students in Türkiye should not be left solely to individual teacher efforts but should be addressed with a holistic approach at the school level and on a national scale. The development of clear standards, guidance documents, and applicable examples for supporting gifted students in general education classrooms can reduce teachers' uncertainties in this area. Furthermore, assessment and evaluation processes need to be restructured to attend not only to academic achievement but also to students' creativity, problem-solving skills, and higher-order thinking processes.

Collaboration between Science and Art Centers and general education schools holds significant potential in the Turkish context. The interaction between these two structures often remains limited; sufficient coherence between the learning experiences students gain at school and at Science and Art Centers is not achieved. Yet regular communication and collaboration established between classroom teachers and Science and Art Center teachers could enable more holistic monitoring and support of students' strengths. Such collaboration could make individualized education plans more functional and ensure that students experience consistent learning experiences both in the school environment and in enrichment programs.

The development of policies for supporting gifted students in inclusive classrooms in Türkiye should be considered not only a pedagogical but also a societal necessity. An education system that can recognize and develop the potential of gifted individuals from early ages will make significant contributions to scientific, cultural, and economic development in the long term. Therefore, strengthening teachers' professional competencies, expanding school-based support mechanisms, and making differentiated instruction a natural part of the education system are of critical importance for the sustainability of gifted education in Türkiye.

Conclusion and Recommendations

The education of gifted students in inclusive settings necessitates that teachers move beyond traditional instructional roles and adopt a multidimensional pedagogical approach. The theoretical frameworks, instructional models, and application examples examined in this chapter clearly reveal the central and transformative role of teachers in helping gifted students realize their potential. In this process, the teacher is positioned not merely as a transmitter of knowledge but as a professional who designs learning environments, guides learning, and monitors and supports student development.

The fundamental condition for success in gifted education is that these students be viewed not only as cognitively advanced individuals but also as individuals possessing unique socio-emotional characteristics and developmental patterns. Characteristics such as asynchronous development, intense sensitivity, and high expectation levels necessitate a holistic perspective in the

educational processes of these students. Teachers' development of this awareness supports not only academic achievement but also students' psychological well-being and long-term motivation for learning.

The enrichment, acceleration, and curriculum compacting strategies discussed in this chapter offer effective and complementary tools for responding to the learning needs of gifted students. However, the application of these strategies in isolation is not sufficient. An effective instructional process requires the flexible integration of these approaches, taking into account the student's readiness level, interests, and learning profile. In this context, the teacher's pedagogical decision-making ability and classroom adaptation competence become determining factors.

Differentiated instruction provides a fundamental framework for supporting gifted students in inclusive classrooms. Conscious differentiation practices in the dimensions of content, process, product, and learning environment enable each student within a heterogeneous class structure to demonstrate their potential. However, for differentiation to be effective, teachers need skills in pre-assessment, using flexible grouping strategies, and continuously monitoring the learning process. These are competencies that develop with experience but can be strengthened through systematic professional support.

Within this framework, ensuring teachers' access to continuous and quality professional development opportunities in gifted education emerges as a critical necessity. Teacher education programs and in-service training should be designed with a reflective and collaborative structure based on classroom practices,

beyond theoretical knowledge. Learning communities where teachers can share experiences with colleagues, discuss practices, and receive feedback can make significant contributions to the dissemination of differentiated instruction.

The active participation of families in the educational process is another important dimension supporting the development of gifted students. Teacher-family collaboration increases the consistency of learning experiences students encounter at school and at home and enables more holistic support for students' interests. Therefore, teachers' regular communication with families and guidance to families should be considered an integral part of inclusive education.

The approach of school administration and institutional support plays a determining role in the sustainability of differentiated instruction. Administrators' creation of a school climate that supports teachers, providing space for flexible practices, and securing necessary resources facilitates teachers' implementation of innovative and student-centered practices. In this context, policies and practices developed at the school level directly affect the quality of classroom instruction.

At the national level, clear policy frameworks for supporting gifted students in inclusive classrooms need to be established. The restructuring of teacher preparation programs in this direction, the determination of standards, and the development of practice-oriented guidance mechanisms are among the fundamental steps for systematic progress. The education of gifted students should be addressed not as a privileged area but as a

natural part of educational equity and support for individual potential.

Future research should examine the effectiveness of differentiated instructional models applied at different educational levels and in various cultural contexts, evaluate the long-term effects of teacher professional development programs, and deeply explore approaches to supporting gifted students from underrepresented groups. Such studies will contribute to making inclusive gifted education more equitable and sustainable.

In conclusion, the effective education of gifted students in inclusive classrooms depends on teachers' pedagogical flexibility, professional competence, and commitment to continuous development. The theoretical frameworks and practice-based approaches presented in this chapter aim to guide teachers in recognizing, supporting, and developing the potential of these students. Every quality investment in the education of gifted individuals supports not only individual development but also societal progress and the cultivation of human resources capable of generating solutions on a global scale.

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CHAPTER 4

BARRIERS AND OPPORTUNITIES IN INCLUSIVE PRACTICES FOR GIFTED STUDENTS

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4.1. Introduction

Inclusive education has occupied a central place in the global education agenda since the second half of the twentieth century, becoming an international policy movement particularly with UNESCO's *1994 Salamanca Statement*. The Salamanca Statement not only advocated for students with disabilities but also championed the inclusion of learners from all segments of society -such as migrants, socioeconomically disadvantaged groups, linguistic minorities, and gifted students- within the same learning environments. By doing so, it spearheaded a paradigm shift in education. This vision aims to move beyond the pursuit of mere equality toward ensuring educational quality, recognizing student diversity, and enabling every individual to realize their unique potential.

However, the discourse on inclusive education has generally evolved around students with disabilities and individuals experiencing learning difficulties, leaving the position of gifted students relatively marginalized within this framework. Yet, gifted learners encounter distinct and complex experiences in inclusive educational settings. While these students may benefit from being educated alongside their peers -gaining advantages such as enhanced social integration, the development of empathy, and the internalization of democratic values- they simultaneously face the risk of insufficient academic stimulation, confinement within standardized curricula, and the inability to fully actualize their intellectual potential (VanTassel-Baska, 2021). Therefore, inclusive education for gifted learners should be conceptualized as a dual-faceted dynamic encompassing both opportunities and challenges.

In the Turkish context, inclusive education policies have increasingly been incorporated into the strategic documents and legal frameworks of the Ministry of National Education in recent years. The *Strategic Plan and Implementation Plan for Gifted Individuals (2013-2017)* explicitly emphasizes supporting these students within inclusive environments, recommending that gifted children in primary schools be educated alongside their peers while being supported through differentiation and enrichment. This policy framework has been updated within the context of the *2024-2028 Strategic Plan* of the Ministry of National Education and the vision of the *"Century of Türkiye Educational Model."* The current strategic document, while highlighting the national, moral, and cultural dimensions of education, identifies the design and implementation of specialized educational programs to support the development of gifted individuals as a strategic priority area (MEB, 2024). Thus, the support of gifted individuals is positioned not merely as an issue of individual academic development but also as one directly linked to social progress and national objectives. However, significant gaps remain between policy documents and classroom practice. Teachers' competencies in differentiated instruction, large class sizes, limited curriculum flexibility, inadequacies in physical and technological infrastructure, and variations in families' awareness levels regarding inclusive education stand out as the main challenges encountered during the implementation process.

On the other hand, the technological opportunities offered by contemporary educational environments -such as AI-powered adaptive learning platforms, virtual and augmented reality applications, and personalized digital

content libraries- create significant possibilities for providing more effective support to gifted students in inclusive classrooms. At the same time, collaborative models between specialized institutions such as BİLSEMs (Science and Art Centers) and mainstream schools, professional learning communities among teachers, and university-school partnerships are also regarded as potential pathways for addressing these challenges.

The international literature indicates that gifted students tend to strengthen their social and emotional skills in inclusive environments, yet they are at times insufficiently supported in academic terms (Matthews & Dai, 2014). Hornby (2015) emphasizes that the success of inclusive education depends on three key components: the physical and technological infrastructure of schools, teachers' competencies, and the involvement of families in the educational process. Tomlinson (2017), on the other hand, highlights the importance of implementing differentiated instruction across the dimensions of content, process, product, and learning environment. However, the extent to which these theoretical models are reflected in schools in developing countries such as Türkiye, the barriers that hinder their implementation, and the opportunities that can be further leveraged remain subjects in need of in-depth investigation.

This chapter draws upon the experiences and perspectives of educators working in various provinces of Türkiye to examine, from a multidimensional perspective, the existing barriers and opportunities for gifted students within inclusive education. The chapter first presents a theoretical and conceptual framework that outlines the

intersection between inclusive education and gifted education, followed by a systematic discussion of structural, pedagogical, and social barriers. Subsequently, it explores the opportunities arising from technological advancements, institutional collaborations, and socio-emotional development initiatives. Finally, the findings are interpreted in light of the international literature, leading to concrete recommendations for policymakers and practitioners.

4.2. Theoretical and Conceptual Framework

Inclusive education and gifted education have historically evolved as two distinct fields grounded in different philosophical foundations and characterized by divergent implementation traditions. While inclusive education is built upon the principles of equality, social justice, and the right of all children to learn together in the same environment, gifted education has traditionally been shaped around differentiation, segregation, and specialized programs. However, over the past two decades, a growing body of literature has begun to explore the intersections of these two domains, questioning how gifted learners can be effectively supported within inclusive settings. This section discusses four key theoretical perspectives that provide a foundation for understanding the inclusive education experiences of gifted students.

Table 2. Key Theoretical Frameworks Referenced in the Chapter

Theory/Model	Key Concepts	Relevance to Inclusive Education
Vygotsky (ZPD)	Social learning, scaffolding	Heterogeneous classrooms enhance social development
Gardner (1983)	Multiple intelligences	Supports recognition of diverse gifted potentials
Tomlinson (2017)	Differentiated instruction	Guides multi-level curriculum design
Hornby (2015)	Inclusive special education model	Emphasizes infrastructure, teacher skills, parental involvement
Renzulli (2016)	Creative productivity (Three-Ring Model)	Links giftedness to creativity and task commitment

Source: Created by the author.

4.2.1. Sociocultural Learning Theory and the Zone of Proximal Development

Vygotsky's sociocultural learning theory posits that learning is not merely an individual cognitive process but an interactive experience situated within social and cultural contexts. At the core of this theory lies the concept of the Zone of Proximal Development (ZPD), which defines the range between what a learner can accomplish independently and what they can achieve with appropriate guidance and support. From this perspective, inclusive classrooms can be viewed as

dynamic environments in which students with varying ability levels engage in learning experiences within each other's ZPDs.

For gifted students, the concept of the ZPD carries particular significance. Their ZPDs are often broader and more complex than those of their typical peers; the tasks provided by standard curricula frequently fall below their independent performance levels and fail to offer sufficient cognitive stimulation. Therefore, creating an effective ZPD for gifted learners in inclusive classrooms requires teachers to provide enriched content, tasks that demand higher-order thinking skills, and advanced levels of instructional scaffolding.

The sociocultural perspective also underscores the social learning opportunities that inclusive classrooms can offer to gifted students. Peer collaboration, exposure to diverse perspectives, and engagement in problem-solving within heterogeneous groups can contribute to the development of these students' social skills, empathy, and democratic values. However, realizing this potential depends on the creation of structured collaborative learning opportunities within the classroom and the presence of deliberate teacher facilitation.

4.2.2. Multiple Intelligences Theory and the Multidimensionality of Potential

Howard Gardner's *Theory of Multiple Intelligences* proposes that intelligence is not a single general ability factor but rather manifests across eight distinct and relatively independent domains: linguistic, logical - mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic. This theory

challenges the traditional IQ-based conception of giftedness by advocating for the recognition and support of students who possess diverse potentials across different domains.

In the context of inclusive education, the Theory of Multiple Intelligences offers two significant implications. First, it acknowledges that gifted students may exhibit exceptional abilities not only in academic areas but also in artistic, social, or psychomotor domains, thereby encouraging the accommodation of such diversity within inclusive classrooms. Second, it underscores the importance of designing differentiated instructional strategies aligned with students' multiple intelligence profiles.

However, standardized curricula and uniform assessment practices in inclusive classrooms often act as barriers to implementing the differentiation proposed by this theory. In exam-oriented education systems, linguistic and logical-mathematical intelligences tend to be disproportionately emphasized, while the potential of gifted students who excel in other intelligence domains may remain unrecognized or insufficiently supported.

4.2.3. Differentiated Instruction Model

Carol Ann Tomlinson's *Differentiated Instruction Model* is one of the most frequently referenced approaches for addressing the needs of gifted students within inclusive education. Tomlinson (2017) identifies four key dimensions of effective differentiation:

Content Differentiation: This involves adapting the knowledge, concepts, and skills presented to students in

terms of complexity, depth, and breadth. For gifted learners, content differentiation may include enriched topics that extend beyond the standard curriculum, interdisciplinary connections, and abstract conceptualizations.

Process Differentiation: This pertains to how students engage with and make meaning of new information. For gifted learners, process differentiation encompasses tasks that require higher-order thinking skills (analysis, synthesis, evaluation), independent research projects, and problem-based learning experiences.

Product Differentiation: This concerns how students demonstrate what they have learned. Gifted learners should be provided with opportunities to create products that are creative, original, and complex—beyond the confines of standardized assessments.

Learning Environment Differentiation: This includes the physical classroom layout, psychological climate, and access to resources. For gifted learners, flexible seating arrangements, rich materials, and an atmosphere that fosters intellectual autonomy are particularly important.

Although Tomlinson's model provides a practical framework for supporting gifted students in inclusive classrooms, its effective implementation requires teachers to possess advanced pedagogical skills, strong time-management abilities, and the capacity to design and adapt instructional materials. Therefore, the success of this model largely depends on teachers' access to continuous professional development opportunities.

4.2.4. Inclusive Special Education Model

Hornby's (2015) *Inclusive Special Education Model* outlines the system-level conditions necessary for the effective support of students with special educational needs -including both students with disabilities and gifted learners- within inclusive settings. Hornby emphasizes that the success of inclusive education rests on three fundamental pillars:

First Pillar: Physical and Technological Infrastructure

To effectively implement inclusive education, schools must possess adequate physical facilities (such as laboratories, libraries, and workshop areas), up-to-date technological tools, and rich learning materials. For gifted learners, this corresponds to access to enriched and advanced learning resources.

Second Pillar: Teacher Competencies

At the heart of inclusive education lie teachers' abilities to differentiate, individualize, and employ multiple instructional strategies while recognizing diverse learning needs. For the education of gifted students, it is crucial that teachers understand their cognitive, social, and emotional characteristics and are able to design appropriate interventions accordingly.

Third Pillar: Parental Involvement

Active family participation is indispensable for the sustainability of inclusive education. Parents of gifted children should be able to recognize their children's

potential, collaborate effectively with schools, and create stimulating learning environments at home.

Hornby's model underscores that the success of inclusive education depends not merely on the individual efforts of teachers but also on systemic and structural conditions, highlighting the importance of policy-level changes and institutional commitment.

4.2.5. Socio-Emotional Development Perspective

The socio-emotional needs of gifted students constitute a dimension that is often overlooked in discussions of inclusive education, yet it remains of critical importance. Many of these students experience challenges in social adjustment due to their distinctive ways of thinking, heightened emotional intensity, and high sensitivity. Within inclusive classrooms, their experiences tend to have a dual nature: while they may find opportunities to develop positive social relationships, they may also face the risk of exclusion or misunderstanding as a result of their "difference."

Well-designed inclusive environments can provide valuable opportunities for gifted learners to develop empathy, engage with diverse perspectives, internalize democratic values, and cultivate a sense of social responsibility. However, realizing this potential depends on ensuring psychological safety within the classroom, enhancing teachers' awareness of socio-emotional learning, and supporting positive peer relationships.

When these five theoretical perspectives are considered together, it becomes evident that inclusive education encompasses both significant opportunities and

considerable challenges for gifted learners. While the sociocultural theory emphasizes the potential for social learning, the differentiated instruction model focuses on addressing academic needs. The theory of multiple intelligences draws attention to the multidimensionality of potential, whereas Hornby's model highlights the importance of systemic and structural conditions. The socio-emotional perspective, in turn, reveals the necessity of adopting a holistic approach. Collectively, these frameworks provide the conceptual foundation for understanding the barriers and opportunities that will be discussed in the subsequent sections.

4.3. Barriers to Inclusive Education for Gifted Students

The potential that inclusive education holds for gifted students is often constrained in practice by a range of structural, pedagogical, and socio-cultural barriers. These obstacles manifest across multiple levels -from systemic shortcomings in policy and resource allocation to classroom- level instructional practices, societal perceptions, and individual competencies. This section examines the major barriers observed within educational settings in Türkiye, situating them within the broader context of international literature. The discussion is organized under four main categories to provide a comprehensive understanding of the challenges that hinder the effective inclusion of gifted learners.

4.3.1. Deficiencies in Physical and Technological Infrastructure

According to Hornby's (2015) Inclusive Special Education Model, the first pillar -physical and

technological infrastructure- constitutes a fundamental prerequisite for the success of inclusive education. However, it has been observed that many educational institutions in Türkiye suffer from serious deficiencies in this area.

The lack of laboratories, outdated equipment, and inadequate libraries in many schools prevent gifted students from engaging in experimental and inquiry-based learning. Limited physical resources confine students with high potential in science, mathematics, technology, and the arts to the standard curriculum. Technological shortcomings further exacerbate the issue. Although smart boards are available, unreliable internet access restricts the use of digital learning platforms and virtual labs, limiting individualized learning opportunities.

These infrastructural gaps create regional inequalities: urban schools are relatively well-equipped, while rural schools face serious shortages. The OECD (2018) report highlights that physical and technological infrastructure is a key determinant of educational quality.

4.3.2. Large Class Sizes and the Challenges of Individualization

Large class sizes constitute a chronic barrier to supporting gifted students in Turkish inclusive education. In public schools, where classes of 35 to 45 students are common, adequately addressing individual needs becomes nearly impossible.

Implementing Tomlinson's (2017) differentiated instruction in overcrowded classrooms requires

exceptional time management and organizational skills. Teachers struggle to manage students progressing at different paces, provide individualized feedback, and design multiple tasks simultaneously. Karadağ's (2019) nationwide study across 47 provinces confirmed that individualized instruction practices were inadequate in 73% of classes exceeding 30 students.

For gifted learners, this often results in "exclusion through neglect". Teachers focus on struggling students while assuming gifted students can progress independently. This leads to underutilization of potential, boredom, and gradual motivation loss. Many teachers report that high class sizes prevent them from allocating time for gifted students, preparing enriched materials, or designing interest-based projects.

4.3.3. The Standardized and Inflexible Nature of the Curriculum

The centralized and standardized structure of the Turkish education curriculum constitutes a structural barrier to supporting gifted students within inclusive education. The expectation that the same learning outcomes will be taught across the country, in the same sequence and at the same pace, leaves little room for differentiation and enrichment.

The intensity of the curriculum and the pressure to complete topics rapidly restrict teachers' ability to engage in in-depth exploration, make interdisciplinary connections, or deviate from prescribed content based on students' interests. Even though gifted students are capable of mastering the standard curriculum at an accelerated pace, the system provides little flexibility to

accommodate such variation. As a result, these students are often required to revisit material they have already mastered, leading to wasted instructional time and reduced motivation.

The exam-oriented nature of the education system further exacerbates this rigidity. The emphasis on preparing for high-stakes national exams compels teachers to focus heavily on test-taking techniques, leaving minimal space for creative, research-based, or project-oriented learning approaches. For gifted learners, standardized tests rarely provide sufficient intellectual stimulation or opportunities to engage their higher-order thinking skills.

From the perspective of Gardner's (1983) *Theory of Multiple Intelligences*, the standardized curriculum's excessive emphasis on linguistic and logical-mathematical intelligence domains results in the underrecognition of gifted students whose strengths lie in other areas. Learners demonstrating exceptional talent in musical, spatial, kinesthetic, or interpersonal intelligences often remain undervalued and insufficiently supported within the current curriculum framework.

4.3.4. Limitations in Teacher Competencies

The second pillar of Hornby's (2015) *Inclusive Special Education Model* -teacher competencies- represents one of the most critical factors in the success of inclusive education. However, a substantial proportion of teachers in Türkiye report feeling inadequately prepared to implement differentiation strategies for gifted learners.

Research conducted within the Turkish context provides concrete evidence of this challenge. A study by Ataman

and Dağlıoğlu (2021) found that 68% of classroom teachers in Türkiye consider themselves insufficiently equipped to identify and support gifted students. The teachers reported that their undergraduate education did not include adequate preparation in this area and that in-service training programs were largely theoretical rather than practice-oriented.

The primary cause of this deficiency lies in the limited emphasis placed on gifted education and differentiated instruction within teacher-training programs. In most faculties of education in Türkiye, gifted education is offered merely as an elective course- or not at all. Consequently, many teachers begin their professional careers without sufficient understanding of the cognitive, social, and emotional characteristics of gifted students or the instructional methods required to meet their needs.

In-service training programs have also failed to fill this gap effectively. Such programs are often short-term, heavily theoretical, and lack follow-up mechanisms, resulting in minimal long-term behavioral change. Teachers frequently struggle to apply the differentiation strategies learned in seminar settings to crowded classrooms with limited resources and an intensive curriculum.

Moreover, teachers' misconceptions and negative attitudes toward gifted learners can further hinder inclusion. Beliefs such as "These students are already successful and do not need additional support" or "Focusing on them would be unfair to others" often render gifted learners invisible within inclusive classrooms. Some teachers also fear that giving special

attention to gifted students might be perceived as elitism, leading them to avoid differentiation altogether.

Similarly, Matthews and Dai (2014) reported that unmet professional development needs among teachers constitute one of the main reasons why gifted learners remain insufficiently supported in inclusive settings.

4.3.5. Insufficient Parental Involvement and Lack of Awareness

The third pillar of Hornby's (2015) Inclusive Special Education Model 'parental involvement' is vital for sustaining inclusive education. Yet in Türkiye, parents' awareness and participation remain limited. Many do not recognize their children's giftedness or know how to support it, especially in socioeconomically disadvantaged areas.

Public understanding of inclusion largely focuses on students with disabilities, leaving gifted learners overlooked. Consequently, families seldom question the adequacy of support provided to their gifted children or collaborate actively with schools. Weak school–family communication and superficial parent-teacher meetings further hinder effective partnerships.

As the OECD (2018) emphasizes, strengthening parental involvement, particularly in disadvantaged communities, is essential for achieving educational equity and improving inclusive education outcomes.

4.3.6. Gaps in Legislation and Policy Frameworks

Although the policy and legislative framework for gifted education in Türkiye has shown notable progress in

recent years, there remains a lack of clear and actionable regulations regarding how the needs of gifted students should be addressed within the context of inclusive education.

The *Strategic Plan and Implementation Plan for Gifted Individuals (2013-2017)* adopted an inclusive perspective; however, it contained ambiguities concerning a concrete roadmap for implementation and the allocation of necessary resources. Similarly, the *Ministry of National Education's 2024-2028 Strategic Plan*, developed within the scope of the *"Century of Türkiye Educational Model*, reemphasizes the education of gifted individuals (MEB, 2024). Yet, operational guidelines and monitoring mechanisms that could bridge the gap between policy documents and classroom practices still require significant strengthening. Schools often lack compelling or incentivizing mechanisms to implement differentiated programs, organize enrichment activities, or provide specialized supports for gifted students.

Furthermore, the absence of standardized criteria for the identification and placement of gifted students leads to inconsistencies and inequalities in practice. While some schools actively conduct identification processes, others take little to no action in this regard.

Performance evaluation and accountability mechanisms also fail to include indicators that measure the support provided to gifted learners within inclusive education, preventing the issue from becoming a genuine priority on school agendas. When these six major barriers are considered together, it becomes evident that the realization of the full potential of inclusive education for

gifted students in Türkiye is hindered by multilayered structural, pedagogical, and cultural obstacles. Overcoming these challenges requires comprehensive system-level reforms, continuous professional development programs, adequate resource allocation, and sustained efforts to raise public awareness.

4.4. Opportunities for Gifted Learners in Inclusive Education

Alongside the challenges that inclusive education poses for gifted learners, it also presents significant opportunities. These opportunities emerge across a wide spectrum-ranging from technological advancements and institutional collaborations to socio-emotional development possibilities and pedagogical innovations. This section discusses the promising opportunities observed within Turkish educational settings, contextualized through connections with successful international practices.

4.4.1. Opportunities Offered by Educational Technologies: One of the most defining characteristics of the twenty-first century is the rapid advancement of educational technologies and their potential to transform learning experiences. Within the context of inclusive education, technological tools provide unique opportunities for gifted learners to engage in individualized and personalized learning experiences.

Artificial Intelligence–Supported Adaptive Learning Platforms: AI-powered adaptive learning platforms can automatically adjust instructional content based on students' individual learning pace, interests, and knowledge levels. When a gifted learner quickly masters

the standard curriculum, AI-driven systems can seamlessly direct them toward more advanced materials, complex problem-solving tasks, and deeper conceptual explanations. Such systems partially address the challenge teachers face in crowded classrooms, where providing individualized attention to each student is often impractical.

Virtual and Augmented Reality (VR/AR) Applications: Virtual and augmented reality applications offer enriched, immersive learning experiences for gifted students, particularly in disciplines such as science, mathematics, history, and geography. Even in schools lacking well-equipped physical laboratories, virtual lab simulations can enable students to conduct complex experiments, reenact historical events in digital environments, or visualize mathematical concepts through three-dimensional representations. These tools foster experiential and inquiry-based learning while bridging the gap between abstract knowledge and tangible understanding.

Online Enrichment Content Platforms: Online enrichment platforms -such as *Khan Academy*, *Coursera*, *edX*, and *TED-Ed*- allow gifted learners to explore their individual interests in greater depth, access university-level courses, and learn from global experts. These platforms provide opportunities that transcend the limited physical resources of school libraries, empowering students to pursue self-directed, advanced, and globally connected learning experiences.

Digital Collaborative Learning Tools: Digital collaborative learning tools enable gifted students from different schools -or even different cities- to work jointly

on projects, exchange ideas, and learn from one another. These tools have the potential to reduce the isolation often experienced by gifted learners in small or remote communities.

Post-pandemic research in Türkiye has demonstrated that technology integration has created significant opportunities for gifted students. In their study on post-COVID-19 education, Çetin and Özdemir (2022) found that digital learning platforms were 41% more effective than traditional methods in accommodating gifted students' individual learning paces. The study also reported that 79% of students expressed increased motivation when provided with access to online enrichment content.

Observations from educators in Türkiye similarly indicate a growing awareness of and enthusiasm for these technological opportunities. The experience of compulsory remote education during the COVID-19 pandemic allowed many teachers and school administrators to discover the potential of digital tools. In the post-pandemic period, the integration of these tools within hybrid learning models offers a significant opportunity to enhance support for gifted learners in inclusive classrooms.

4.4.2. Inter-Institutional Collaboration and Network Building

In inclusive education, the resources and expertise of a single institution may not be sufficient to meet the needs of gifted students. In this context, establishing collaboration networks among different institutions represents a significant opportunity.

BİLSEM–Mainstream School Collaboration Models can enable gifted students in Türkiye to both remain integrated with their peers in inclusive environments and benefit from programs designed to develop their special talents. Allowing BİLSEMs to offer open workshops, project mentorship, or consultancy programs for gifted students in mainstream schools -either during specific hours of the week or on weekends- can substantially strengthen the inclusivity and effectiveness of educational practices.

Pilot implementations of BİLSEM-mainstream school collaboration models in Türkiye have yielded promising outcomes. A study conducted by Sak and Maker (2020) at Anadolu University demonstrated that a systematic collaboration protocol established between BİLSEMs and mainstream schools positively influenced gifted students' academic and social development. In the study, 84% of participating students reported that the collaboration model provided them with opportunities both to socialize with their peers and to further develop their special talents.

University–School Partnerships and Professional Learning Communities

University–School Partnerships can provide gifted students with opportunities to use university laboratories, receive mentorship from faculty members, participate in advanced-level courses, or collaborate with university students on joint research projects. Such partnerships not only offer enriched learning experiences for students but also contribute to universities' fulfillment of their social responsibility roles.

Professional Learning Communities among Teachers can serve as platforms through which educators from different schools share experiences, disseminate best practices, and support one another in the field of gifted education. Online communities, in particular, enable teachers to overcome geographical barriers and access a broader network of professional collaboration.

Non-Governmental Organizations (NGOs) and Foundations can play a complementary role in supporting inclusive schools by organizing scholarship programs, summer schools, competitions, and enrichment activities for gifted learners. By providing resources, educational materials, and professional expertise to schools, these organizations can enhance the overall quality of inclusive education.

Educators recognize the potential of such collaborations; however, they also note that current partnerships are neither sufficiently systematic nor widespread. Strengthening coordination mechanisms and institutionalizing collaboration structures remain key opportunities for advancing inclusive education for gifted learners.

4.4.3. Socio-Emotional Development and Empathy Skills

One of the most powerful aspects of inclusive education lies in the opportunities it provides for socio-emotional development through the interaction of students with diverse abilities, cultures, and characteristics. For gifted learners, this dimension represents an area of growth that is as essential as academic achievement.

Empathy and Perspective-Taking Skills naturally develop in heterogeneous classrooms. When gifted students interact with peers who learn at different paces, face different challenges, or possess distinct strengths, they cultivate the ability to understand others' perspectives and appreciate differences. These skills are of critical importance in the global and multicultural landscape of the twenty-first century.

Leadership and Mentorship Opportunities can also be offered to gifted learners within inclusive classrooms. Such students can take on responsibilities such as assisting peers academically, leading group projects, or organizing classroom activities. These experiences not only benefit others but also foster gifted students' social competence, communication abilities, and self-confidence.

Democratic Values and Social Responsibility Awareness can be more effectively nurtured in diverse learning environments. When gifted learners become aware of their privileges and recognize the value of helping others, they have the potential to become conscious and responsible individuals who contribute meaningfully to social transformation.

Realistic Self-Perception and Humility tend to develop more healthily in heterogeneous classrooms than in homogeneous groups of gifted learners. When gifted students interact with peers who possess different strengths across various domains, they learn to contextualize their own abilities and realize that they do not need to excel in every area.

From Vygotsky's sociocultural perspective, inclusive classrooms can create a rich *Zone of Proximal Development (ZPD)*. Gifted learners may guide their peers in certain domains while learning from them in others such as social skills, art, or music.

Educators' observations indicate that gifted students generally develop positive social relationships within inclusive environments and form healthy bonds with their peers. This finding balances the concern often expressed in the literature that gifted students may experience social isolation in inclusive settings.

4.4.4. Pedagogical Innovation and Differentiation Practices

Inclusive education creates a dynamic that compels teachers to become pedagogically innovative-an imperative that simultaneously presents a valuable opportunity. Consistent with Renzulli's emphasis on creative productivity, inclusive classrooms can cultivate not only advanced ability but also creativity and task commitment through inquiry, mentorship, and product-oriented enrichment (Renzulli, 2016).

Project-Based Learning (PBL): *Project-Based Learning (PBL)* enables students with varying ability levels in inclusive classrooms to work collaboratively on the same project while assuming different roles and responsibilities. Gifted students can take on more complex tasks within the project, delve deeper into the research component, or handle sections that require analysis and synthesis. This approach is effective both for providing academic challenge and for fostering collaboration and teamwork skills.

Station Rotation Learning Model: The *Station Rotation Learning Model* is an instructional method in which tasks of varying difficulty levels are placed in different areas of the classroom, and students rotate among these stations. Advanced stations can be specifically designed for gifted students, allowing them to progress at their own pace while engaging in higher-level learning activities.

Peer Teaching and Collaborative Grouping: As Tomlinson (2017) suggests, when organized flexibly and strategically, *peer teaching* and *collaborative grouping* can create structures that benefit both gifted and non-gifted learners. Gifted students may experience deeper learning when teaching their peers -since teaching is among the most effective ways to learn- and may also collaborate with students of similar ability levels on challenging tasks. Such arrangements promote mutual growth, social interaction, and the sharing of diverse perspectives.

Individualized Learning Plans (ILPs): *Individualized Learning Plans (ILPs)* are flexible roadmaps designed according to each student's needs, interests, and learning styles. For gifted learners, ILPs may include enriched content, accelerated progression, and specialized projects tailored to their unique strengths and aspirations.

Flipped Classroom Model: The *Flipped Classroom* model is an instructional approach in which core content is learned at home through videos or reading materials, while classroom time is devoted to application, discussion, and deep learning activities. Gifted students can complete foundational content quickly and use class time to engage in higher-level, exploratory, and analytical tasks.

Educators acknowledge the potential of such pedagogical innovations but emphasize the need for sufficient time, training, and resources to implement them systematically. Investment in this area can significantly enhance the overall quality and inclusiveness of education.

4.4.5. Opportunities for Early Identification and Intervention

Inclusive educational settings also offer important opportunities for the early recognition of gifted students. Teachers, through daily classroom interactions, have the chance to observe students' strengths, interests, learning pace, and potential in authentic learning contexts.

Natural Observation Environments: Inclusive classrooms provide opportunities to observe students' natural behaviors, problem-solving abilities, creativity, and social interactions. Such observations can reveal talents and potentials that standardized tests may fail to capture.

Multiple Identification Methods: The inclusive approach encourages the identification of giftedness not solely through IQ tests but via multiple sources such as teacher observations, portfolios, performance tasks, and creative products. This multi-dimensional framework facilitates the recognition of gifted students from culturally and linguistically diverse backgrounds who might otherwise be overlooked.

Early Intervention: When potential is identified early, appropriate support can be provided in a timely manner. Enrichment programs, mentoring, and guidance delivered during critical developmental periods can have a

profound impact on students' long-term achievement and personal growth.

4.4.6. Policy and Public Awareness Enhancement

In recent years, increasing policy attention toward gifted education in Türkiye and a rising level of public awareness on this issue have created a significant window of opportunity. A concrete reflection of this opportunity is the integration of the development of gifted individuals into the *"Century of Türkiye Educational Model"* vision within the *Ministry of National Education's 2024-2028 Strategic Plan* (MEB, 2024). This updated policy document links gifted education with national development goals, demonstrating a strengthened institutional commitment to the issue.

Strategic Documents and Action Plans, help maintain the visibility of gifted education within inclusive settings and contribute to the creation of institutional memory. These policy instruments can serve as a foundation for future policy design and improvement efforts.

Media Attention and Public Sensitivity, have also played a role in shaping public perception. Increased media coverage of the stories of gifted children has raised interest among families and educators, generating broader societal demand for action - a dynamic that can accelerate policy change.

International Best Practices and Comparative Studies, offer valuable opportunities for learning and adaptation. Türkiye's active participation in international platforms such as the OECD and UNESCO provides

access to successful global models that can inform the development of more effective inclusive practices.

Inclusive education offers considerable opportunities for gifted learners. Technological tools, institutional collaborations, socio-emotional development opportunities, pedagogical innovations, and growing policy interest constitute the core components of these opportunities. However, realizing their full potential requires systematic planning, adequate resource allocation, teacher empowerment, and sustained institutional coordination.

4.5. Discussion and Implications

The findings presented in this chapter reveal that the experiences of gifted students within inclusive education are multidimensional and complex in nature. The barriers and opportunities observed in Turkish educational settings show strong parallels with discussions in the international literature, while also highlighting the decisive role of country-specific contextual factors.

4.5.1. The Persistence of Structural Barriers and the Need for Systemic Reform

Research findings indicate that the most fundamental barriers to inclusive education in Türkiye exist at the structural and systemic levels. Deficiencies in physical and technological infrastructure, large class sizes, a standardized curriculum, and limited resources are challenges that cannot be overcome through individual teacher efforts alone. This finding aligns closely with the propositions of Hornby's (2015) *Inclusive Special*

Education Model, which emphasizes that the success of inclusive education depends on system-level conditions rather than solely on individual factors.

International comparisons suggest that such structural challenges are not unique to Türkiye, yet they tend to be more pronounced in developing countries. The OECD's (2018) *Education for Equity Report* similarly highlights these systemic barriers and recommends comprehensive policy reforms, strategic resource allocation, and targeted investments -particularly for disadvantaged regions- to address them effectively. Countries that have achieved success in inclusive education, such as Finland, Singapore, and South Korea, share common characteristics: low student-teacher ratios, adequate resource distribution to schools, and flexibility within the curriculum.

In the Turkish context, overcoming these structural barriers requires a long-term and comprehensive reform strategy rather than short-term, fragmented interventions. Reducing class sizes, strengthening schools' physical and technological infrastructure, and introducing greater curricular flexibility should constitute the core components of this strategy.

4.5.2. The Critical Importance of Teacher Education

The findings demonstrate that teacher competencies play a central role in the success of inclusive education. A significant proportion of teachers in Türkiye lack sufficient preparation in gifted education and differentiated instruction, which hinders the translation of theoretical models into classroom practice. This finding parallels the conclusions of Matthews and Dai (2014),

who emphasize that the failure to meet teachers' professional development needs is one of the main reasons why gifted learners remain insufficiently supported in inclusive settings.

Tomlinson's (2017) *Differentiated Instruction Model* theoretically provides an effective framework for supporting gifted learners within inclusive classrooms. However, implementing this model requires teachers to possess advanced pedagogical skills, creativity, and organizational capacity. Consequently, updating teacher preparation programs and enhancing the quality of in-service training are indispensable for improving the effectiveness of inclusive education.

International best practices highlight the transformative impact of investing in teacher education. In Finland, all teachers hold a master's degree, regularly participate in continuous professional development programs, and actively engage in collaborative learning communities. In Singapore, teachers are provided with 100 hours of professional development annually, supported through strong institutional frameworks. By learning from such experiences, Türkiye can achieve substantial long-term gains through sustained investments in teacher education and professional growth.

4.5.3. The Transformative Potential of Technology

The findings indicate that educational technologies represent one of the most promising opportunities for supporting gifted learners within inclusive education. Artificial intelligence-based adaptive learning platforms, virtual and augmented reality applications, online enriched content libraries, and digital collaborative tools

have the potential to transcend the limitations of traditional classroom environments.

UNESCO's (2020) report *"Inclusion and Education: All Means All"* similarly emphasizes that technology can serve as a transformative force in inclusive education. However, the report also cautions that inequalities in access to technology may create new forms of exclusion. In Türkiye, the digital divide manifests in significant disparities between urban and rural areas, across socio-economic groups, and between different types of schools (public versus private).

To fully harness the potential of technology, it is essential to ensure equitable access for all schools, provide teachers with training in technology integration, and develop digital content tailored to the Turkish language and national curriculum. The experiences gained during the COVID-19 pandemic have generated substantial momentum in this area, accelerating the integration of technology into education. Sustaining this momentum through well-designed and long-term policies will be crucial for maximizing its inclusive impact.

4.5.4. Ensuring the Socio-Emotional Dimension Is Not Overlooked

While discussions of inclusive education often prioritize academic dimensions, the socio-emotional aspect tends to remain in the background. However, the findings indicate that inclusive settings offer significant opportunities for gifted learners to develop empathy, social competence, and democratic values.

From Vygotsky's sociocultural learning perspective, heterogeneous classrooms can serve as ideal environments for rich social learning experiences. Gifted learners require diverse settings not only for cognitive growth but also for social and emotional development. Clark's (2013) work on gifted development similarly emphasizes the importance of social interaction for the holistic growth of gifted students.

Nevertheless, realizing this potential depends on ensuring psychological safety within classrooms, preventing peer bullying, and cultivating a culture of respect for diversity. Teachers' awareness and competence in socio-emotional learning are therefore of critical importance.

4.5.5. Strengthening Parental Involvement

The findings reveal that parental involvement remains one of the weakest components of inclusive education. According to Hornby's (2015) model, family engagement constitutes one of the three foundational pillars of inclusive education. However, in Türkiye, most parents lack sufficient knowledge about what inclusive education entails, what rights their gifted children possess within these environments, and how they can be effectively supported.

The international literature consistently demonstrates the strong influence of parental involvement on student achievement. VanTassel-Baska's (2021) research highlights that the active participation of parents of gifted learners in the educational process significantly enhances students' motivation, self-efficacy, and academic success.

To increase family participation in Türkiye, several strategies can be implemented: organizing informational seminars for parents, strengthening school–family collaboration mechanisms, involving parent representatives in decision-making processes, and establishing parent support groups. These initiatives can play a crucial role in fostering shared responsibility and strengthening the home-school connection within inclusive education.

4.5.6. The Importance of Contextual Factors

Finally, it must be acknowledged that the success of inclusive education is highly dependent on contextual factors. Türkiye's sociocultural structure, educational traditions, economic conditions, and societal values all play a crucial role in shaping inclusive education practices. Rather than directly transferring models that have proven successful in Western countries, developing locally grounded models tailored to Türkiye's unique conditions would be more effective.

In this context, documenting, sharing, and disseminating successful local practices is of great importance. Systematically analyzing and scaling up effective implementations developed in different regions and schools across Türkiye can lead to more sustainable outcomes than the direct importation of foreign policy models.

The central conclusion that emerges from this discussion is that inclusive education presents both significant opportunities and serious challenges for gifted learners. Overcoming these barriers and capitalizing on these opportunities require systemic reforms, continuous

teacher training, investment in technology, the strengthening of parental involvement, and the development of context-sensitive policies. It is evident that no single intervention will suffice; instead, a multidimensional and coordinated approach is essential.

4.6. Conclusion and Recommendations

This chapter has examined the experiences of gifted students within inclusive education from a multidimensional perspective, analyzing both the barriers they face and the opportunities available to them. Observations derived from educational settings in Türkiye, combined with comparisons to international literature, reveal that while the field faces substantial challenges, it also holds considerable promise.

4.6.1. Key Findings

The main findings of the research can be summarized as follows:

First, the most significant barriers to inclusive education are structural and systemic in nature. Deficiencies in physical and technological infrastructure, overcrowded classrooms, a standardized and inflexible curriculum, limited teacher competencies, low levels of parental engagement, and gaps between legislation and classroom implementation constitute challenges that cannot be overcome through individual effort alone. Addressing these barriers requires comprehensive policy reforms, adequate resource allocation, and transformation at the systemic level.

Second, teacher education is a critical determinant of success in inclusive education. Theoretical models such

as Tomlinson's differentiated instruction framework, Hornby's inclusive special education approach, and Gardner's multiple intelligences theory can only be effectively translated into practice if teachers are adequately trained and competent in these areas. However, current pre-service and in-service teacher education programs in Türkiye fall short of meeting this need.

Third, educational technologies represent one of the most promising opportunities for supporting gifted learners within inclusive settings. Artificial intelligence-based adaptive learning platforms, virtual and augmented reality applications, enriched online content, and digital collaborative tools hold the potential to transcend the limitations of traditional classrooms. Yet realizing this potential requires reducing digital inequalities and equipping teachers with the necessary skills for effective technology integration.

Fourth, inclusive education is not merely an academic matter but also one of social justice and democratic values. The presence of gifted learners alongside their peers in heterogeneous classrooms contributes to the development of empathy, perspective-taking, and social responsibility. This socio-emotional benefit represents one of the greatest strengths of inclusive education and should not be overlooked.

Fifth, inter-institutional collaboration models hold substantial potential. Partnerships between Science and Art Centers (BİLSEM) and mainstream schools, university-school collaborations, professional learning communities among teachers, and the involvement of non-governmental organizations can all enhance the

quality of inclusive education. However, such collaborations need to be made more systematic and institutionalized to ensure sustainability and impact.

4.6.2. Policy Recommendations for Decision-Makers

To ensure that gifted learners are effectively supported within inclusive education systems, the following policy-level actions are recommended:

Clarification of Inclusive Education Legislation: Existing strategic and policy documents should include clear, concrete, and actionable provisions regarding how gifted students are to be supported within inclusive settings. Rather than using broad statements such as "differentiation should be implemented," detailed roadmaps should be developed that explicitly address the questions of *how*, *by whom*, *with what resources*, and *within what timeframe* such differentiation will occur.

Reducing Class Sizes: For inclusive education to function effectively, class sizes should be gradually reduced. The OECD average of 20–25 students per class should be adopted as a long-term target. Although this may appear costly in the short term, it will yield substantial long-term gains in terms of educational quality and student achievement.

Investment in Physical and Technological Infrastructure: All schools should be equipped with adequate laboratories, libraries, technological tools, and stable internet infrastructure. Positive discrimination should be applied to schools in disadvantaged regions to ensure equity of opportunity in education.

Enhancing Curriculum Flexibility: While maintaining the overall coherence of the national curriculum, teachers and schools should be granted the authority to adapt, deepen, and enrich content at the local level. Legal and administrative mechanisms should facilitate gifted learners' engagement in advanced studies, acceleration opportunities, or participation in university-level courses where appropriate.

Reforming Teacher Education: Courses on gifted education and differentiated instruction should be made mandatory in the curricula of faculties of education. In-service training programs should move beyond theoretical seminars and instead be designed as practice-oriented workshops, mentorship initiatives, and school-based professional development models. Adequate time and financial resources should be allocated for teachers' continuous professional growth.

Updating Performance Indicators: School and teacher performance evaluation systems should incorporate new indicators such as *implementation of differentiated instruction*, *support for gifted students*, and *inclusive classroom practices*. Accountability frameworks should focus not only on examination results but also on schools' and teachers' capacities to respond effectively to student diversity.

Institutionalizing Inter-Agency Collaboration Mechanisms: Systematic collaboration protocols should be developed between Science and Art Centers (BİLSEM) and mainstream schools. Faculties of education at universities should establish structures to provide consultancy, teacher training, and research support to schools.

Policies Supporting Parental Involvement: Free educational programs, counseling services, and informational seminars should be organized for parents. School–family collaboration mechanisms should be strengthened, and parental participation in decision-making processes should be actively encouraged.

4.6.3. Recommendations for Practitioners

For school administrators and teachers, the following recommendations are proposed:

Systematic Implementation of Differentiated Instruction Strategies: Drawing on Tomlinson's model, differentiation should be applied across the four dimensions of content, process, product, and learning environment. Each lesson plan should include enriched or extended tasks specifically designed for gifted learners to ensure continuous intellectual challenge.

Use of Flexible Grouping Strategies: Classroom organization should alternate between homogeneous ability groups, heterogeneous cooperative groups, and individual study formats. Gifted students should be provided with opportunities to work with peers of similar ability levels as well as to collaborate with diverse groups, promoting both academic growth and social development.

Promotion of Project-Based and Inquiry-Oriented Learning: In addition to standard instruction, students should be offered opportunities to engage in in-depth research and long-term projects aligned with their personal interests. Such approaches foster autonomy,

creativity, and higher-order thinking skills among gifted learners.

Integration of Educational Technologies: Available technological tools should be utilized to their fullest potential. Adaptive learning platforms, virtual laboratories, online courses, and digital content should be systematically integrated into classroom teaching to enhance individualized learning and engagement.

Sensitivity to Socio-Emotional Needs: The social and emotional needs of gifted students must be addressed alongside their academic development. Classrooms should ensure psychological safety, maintain a zero-tolerance policy toward bullying, and cultivate a culture of respect for diversity and inclusion.

Engagement in Continuous Professional Development: Teachers should continuously improve their competence in gifted education and differentiated instruction. Collaboration with colleagues, sharing of best practices, and adoption of reflective teaching practices are essential for sustained professional growth.

Strengthening Communication with Families: Regular and meaningful communication should be maintained with the families of gifted learners. Teachers should provide detailed feedback on student progress and actively involve parents in the learning process to ensure consistent support between home and school.

4.6.4. Recommendations for Future Research

To further deepen understanding in this field, the following research directions are recommended:

Longitudinal Follow-Up Studies: There is a need for longitudinal research examining how the academic achievement, socio-emotional development, and career trajectories of gifted students educated in inclusive environments evolve over time. Such studies would provide valuable insights into the long-term effectiveness of inclusive education models.

Comparative Case Studies: In-depth analyses of schools across different regions of Türkiye that have successfully implemented inclusive practices under varying socio-economic conditions can contribute to the dissemination of effective models and best practices nationwide.

Impact Studies on Technology Integration: Empirical studies should investigate the effects of various technological tools -such as artificial intelligence-based adaptive learning systems, virtual and augmented reality applications, and digital platforms- on the learning experiences and motivation of gifted students.

Effectiveness of Teacher Education Programs: Future research should evaluate how different professional development models -such as workshops, mentoring, and professional learning communities- enhance teachers' competencies in differentiated instruction and inclusive practices.

Parental Involvement Intervention Programs: It is essential to design and evaluate intervention programs aimed at increasing parental engagement in inclusive education processes. Research should explore how such programs influence family-school collaboration and the educational outcomes of gifted learners.

4.6.5. Conclusion

Inclusive education represents a complex field that encompasses both challenges and opportunities for gifted learners. Enabling these students to fully realize their potential depends on education systems capable of balancing academic excellence with social justice and harmonizing individual needs with collective well-being.

Türkiye's journey toward inclusive education is ongoing. The obstacles encountered along the way are too significant to ignore, yet the opportunities that exist are too valuable to overlook. Through structural reforms, continuous teacher education, investment in technology, strengthened family involvement, and increased public awareness, these challenges can be overcome and the opportunities effectively leveraged.

Ultimately, supporting gifted students within inclusive education is not only essential for their individual development but also for the advancement of society as a whole. A society in which gifted individuals can fulfill their potential -while embracing diversity and developing a sense of social responsibility- can build a more just, creative, and prosperous future.

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CHAPTER 5

PARENTAL INVOLVEMENT AND PARENTAL PERSPECTIVES IN INCLUSIVE EDUCATION

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5.1 Introduction

The inclusive education approach aims to create learning environments in which all students—regardless of differing characteristics, ability levels, and learning needs—can learn together in an equitable, fair, and effective manner. This perspective has expanded beyond students with special educational needs to explicitly include gifted and talented learners. Within inclusive education models, parental involvement is widely recognized as a critical component that actively contributes to students' learning processes while supporting their social and emotional development. In the literature, parental involvement is defined as a multidimensional construct encompassing participation in educational decision-making, ongoing communication with schools, the enrichment of learning environments, and the organization of home–school collaboration (Afolabi, 2017; Kurniati et al., 2025).

In academic discourse, parental involvement is commonly described as parents' active, sustained, and meaningful contributions to their children's educational processes. This understanding extends beyond participation in school-based activities to include learning support in the home environment, engagement in school policies, and coordinated collaboration with teachers (Rehabilitation Journals, 2025). Such a model of involvement constitutes a foundational element of inclusive education, supporting students' academic progress alongside their emotional development.

From the perspective of gifted and talented students, the role of parental involvement becomes even more pronounced. Gifted learners often require individualized

support processes beyond conventional school practices in order to achieve appropriate levels of instructional alignment and sufficient cognitive challenge. In this context, families assume critical roles in recognizing their children's abilities, seeking appropriate educational opportunities, and supporting emotional and social competencies (Ogurlu, 2016). International research likewise demonstrates that parents' perceptions of their gifted children significantly influence developmental outcomes; for instance, how parents interpret their children's abilities and what forms of educational support they expect are closely associated with students' academic achievement and social adjustment (Jung, 2024).

Moreover, a substantial body of research on parental involvement, while outlining general trends within inclusive education, also offers specific findings related to families of gifted children. These studies typically examine parental roles in terms of school collaboration, home-based learning support, and the enhancement of children's self-efficacy beliefs (ResearchGate, 2022).

Accordingly, the remainder of this chapter examines, with reference to the literature, the conceptual framework of parental involvement; the significance of parental involvement in gifted-focused educational processes; parental perspectives and perceptions; factors influencing parental involvement; and models of school–family collaboration in inclusive education.

5.2 Conceptual Framework of Parental Involvement

Parental involvement is a multidimensional concept that has been extensively discussed in the educational

sciences literature for many years as one of the core components of inclusive education. In its broadest sense, parental involvement is defined as parents' active, sustained, and collaborative participation in both school-based and out-of-school processes related to their children's academic, social, and emotional development. This participation extends beyond attendance at school meetings or events to include supporting learning in the home, maintaining regular communication with teachers, contributing to decision-making processes, and adopting a shared approach to the formulation of educational goals (Hoover-Dempsey & Sandler, 1997). Within the context of inclusive education, the scope of parental involvement expands further, as inclusive education is grounded in an understanding that regards individual differences among students not as barriers but as valuable resources for learning. Accordingly, families occupy a central position in the educational process as key stakeholders who are most familiar with their children's strengths, developmental needs, cultural backgrounds, and learning styles. From the perspective of Bronfenbrenner's (1979) ecological systems theory, the family and the school constitute the two most immediate interactional environments shaping a child's development; the stronger, more consistent, and more collaborative the relationship between these environments, the more positively the child's learning experience is likely to progress.

Contemporary approaches to parental involvement emphasize that participation should be understood not as passive observation but as an egalitarian partnership established between families and schools. Epstein's (2011) *School–Family–Community Partnership Model* is

one of the most influential references within this framework. According to Epstein, parental involvement occurs across six primary domains: parenting, communication, volunteering, learning at home, participation in decision-making processes, and school–community collaboration. This model prioritizes schools' responsibility to guide families who assume diverse roles and to empower parents as active partners. In this way, parental involvement evolves into a multilayered sphere of interaction that not only enhances children's academic achievement but also supports their emotional resilience, motivation, and social adjustment.

The concept of parental involvement is particularly critical in the education of gifted and talented children. Gifted students often display learning speeds, areas of interest, and cognitive profiles that differ from those of their peers, resulting in distinctive educational needs. For this reason, families' willingness to share information about their children's learning processes, articulate expectations, and maintain continuous collaboration with teachers is decisive in ensuring that students' potential is accurately understood and effectively supported (Ogurlu, 2016). Empirical research likewise indicates that parental involvement has positive effects on both academic achievement and self-regulation skills among gifted learners (Moon & Reis, 2004; Jung, 2024).

Another dimension of the conceptual framework of parental involvement concerns participation motivation. Hoover-Dempsey and Sandler (1997) identify three primary motivational domains that explain why families choose to become involved in their children's education:

1. Parents' perceptions of their own parental roles,

2. Their perceptions of the school and teachers as positive and accessible, and

3. Their belief that involvement will benefit their child.

When any of these dimensions is weak, parental involvement tends to decline; when they are strong, school–family collaboration becomes more effective and productive.

In conclusion, parental involvement is not merely a complementary element of inclusive education but one of its most fundamental structural components. Active family participation facilitates a more accurate understanding of students' needs within inclusive education practices, contributes to the development of individualized learning goals, and enhances the overall quality, continuity, and coherence of students' learning experiences. From this perspective, parental involvement emerges as a critical concept within inclusive education, both theoretically and in terms of practical implementation.

5.3 The Importance of Parental Involvement in the Context of Gifted Students

Gifted students constitute a group of learners who differ from their peers in terms of cognitive, affective, and social development, often demonstrating high levels of learning motivation and rapid comprehension abilities. The developmental profiles of these students necessitate a more active and informed role for families within the educational process. The literature emphasizes that parental involvement in the education of gifted students is not merely a supportive element but a fundamental

factor in facilitating the realization of children's potential (Moon & Reis, 2004; Ogurlu, 2016).

Parental involvement in the educational processes of gifted students is commonly understood to exert influence across three primary dimensions:

1. Academic development,

2. Social and emotional well-being, and

3. Learning motivation and self-regulation skills.

a) Impact on Academic Development

Research indicates that the sustained academic success of gifted students, their access to appropriate learning opportunities, and their ability to benefit from individualized educational programs are closely associated with the level of parental involvement. The early identification of students' strengths, the provision of enriched educational stimuli, and referrals to extracurricular enrichment activities are often made possible through families' observations and initiatives (Jung, 2024).

For example, when families recognize their children's areas of talent and advocate for educational practices such as acceleration, enrichment, or ability grouping, students are more likely to be placed in learning environments that align with their needs, thereby directly influencing academic performance. In this respect, parental involvement plays a critical role in mitigating educational opportunity gaps among gifted students and in ensuring equitable access to appropriate educational provisions (Cross & Cross, 2015).

b) Contribution to Social and Emotional Development

The social and emotional profiles of gifted students often differ from those of their peers. Heightened emotional experiences, perfectionism, high sensitivity, and, at times, tendencies toward social maladjustment are more frequently observed among this group. The literature indicates that family support plays a decisive role in meeting the social and emotional needs of gifted learners (Neihart, 2006).

Families' ability to understand children's emotional responses, provide support in areas such as stress management, anxiety, and perfectionism, and encourage participation in social contexts has a positive impact on the psychological well-being of gifted students. Particularly during periods corresponding to adolescence, the quality of family support is identified as a significant protective factor in the development of self-esteem and a sense of social belonging (Foley-Nicpon, 2013).

c) Impact on Learning Motivation and Self-Regulation Skills

Another important dimension of parental involvement concerns its role in supporting students' learning motivation and self-regulation skills. Although gifted students may possess high academic potential, the sustainability of achievement is largely associated with the development of study discipline, time management, goal-setting abilities, and the capacity to manage one's own learning processes.

Research demonstrates that family–child interactions strengthen students' motivation to learn and support the

development of self-regulation skills (Zimmerman, 2008). Academic guidance provided by families enables students to internalize their learning processes and to set their own learning goals. Moreover, by supporting students' areas of interest, families render learning experiences more meaningful, which constitutes an important factor in enhancing intrinsic motivation.

d) The Role of Families in Educational Decision-Making Processes

In inclusive educational settings, meeting the needs of gifted students requires the establishment of a strong communication network among teachers, guidance services, and families. Families' participation in educational decision-making processes is essential for the individualization of students' educational plans, the identification of appropriate instructional strategies, and referral to relevant support services (Epstein, 2011).

Indeed, the policies of the Ministry of National Education and those of many countries define parental involvement not merely as a supportive element but as a mandatory component of educational planning. Numerous studies emphasize that in educational processes where families are not positioned as strong stakeholders, the potential of gifted students cannot be fully realized (Çifci & Alkan, 2020).

e) The Distinctive Role of Parental Involvement in Inclusive Education

The inclusive education approach requires a model of collaboration in which families are able to articulate students' individual differences and engage with schools

on an equal footing. In the context of gifted students, such collaboration becomes even more critical for integrating children's unique learning pace, areas of interest, and developmental needs into educational practices.

Accordingly, parental involvement constitutes a determining factor in the applicability and quality of inclusive education for gifted students, rather than serving merely as a supportive component.

5.4 Parental Perspectives: Expectations, Perceptions, and Experiences

The effectiveness of inclusive education practices is closely linked not only to institutional infrastructure and pedagogical approaches but also to the attitudes, cognitive representations, and lived experiences that parents develop in relation to these processes. Families of gifted children display patterns of expectations that span a broad spectrum, ranging from accelerated cognitive development to psychosocial needs. Within this context, an in-depth analysis of parental perspectives is indispensable for strengthening the inclusive education ecosystem.

National and international studies in the literature indicate that parental perspectives crystallize around four primary dimensions:

1. Expectation dynamics,

2. Perceptual frameworks,

3. Lived experiences, and

4. Encountered challenges.

a) Parental Expectations

Parents' expectations regarding the inclusive education paradigm are fundamentally grounded in the recognition of children's individual differences and the meaningful integration of these unique characteristics into educational processes. Among parents of gifted children, prevailing expectation patterns tend to concentrate along the following key axes:

- teachers' possession of advanced and specialized expertise in the phenomenology of giftedness;
- the systematic provision of enriched curricular content aligned with children's cognitive capacities;
- the development of personalized pedagogical approaches responsive to learning pace and cognitive processing styles;
- the careful monitoring and support of social and emotional developmental processes; and
- the establishment of transparent, sustainable, and reciprocal communication networks along the school–family axis.

A comprehensive study conducted by Jung (2024) demonstrates that the majority of parents of gifted students hold high expectations concerning the recognition and systematic support of their children's intellectual capacities. Similarly, empirical studies conducted in the Turkish context document that parents exhibit strong sensitivity to the quality of educational services provided to their children and often perceive that

their expectations are not being adequately met (Çifci & Alkan, 2020).

Taken together, these findings clearly indicate that inclusive education cannot be reduced to mere physical integration. Rather, it requires a dynamic and adaptive pedagogical approach that is responsive to individual needs and attentive to the distinctive profiles of gifted learners.

b) Family Perceptions

Parents' perceptual frameworks regarding the inclusive education paradigm are shaped by a range of multilayered variables, including teacher competencies, institutional infrastructure, classroom-level pedagogical practices, macro-level education policies, and the phenomenological quality of children's school experiences. Analysis of family perceptions reveals three primary patterns:

1. **Positive perceptual framework:** This pattern encompasses parental perceptions that children's social development progresses in a more balanced manner, that interaction within heterogeneous peer groups strengthens empathic capacity, and that inclusive classroom environments prepare children for broader social contexts.

2. **Neutral/uncertainty-oriented perceptual framework:** This pattern represents parents who experience uncertainty regarding the extent to which their children's academic needs are being met, evaluating some practices positively while expressing concern about others.

3. **Negative perceptual framework:** This pattern includes parental perceptions that their children's potential is not sufficiently recognized or that differentiated instructional strategies responsive to the unique needs of gifted students are not being effectively implemented (Moon & Reis, 2004; Foley-Nicpon, 2013).

Neihart (2006) emphasizes that family perceptions are directly influenced by teacher quality and the coherence of institutional policies regarding gifted education.

c) Parental Experiences

Families' lived experiences offer micro-level reflections of the everyday practices of inclusive education. These experiential patterns tend to crystallize across several key domains:

- **Dynamics of communication with teachers:** Parents report that educational processes are more effective when regular and transparent communication channels are in place. In particular, teachers' recognition and assessment of students' strengths emerge as factors that catalyze parental satisfaction.
- **Institutional support mechanisms:** Psychological counseling services, enrichment programs, and individualized instructional interventions are commonly identified by families as positive experiential elements.
- **Social adaptation processes:** While some parents report that their children encounter difficulties in peer relationships, others indicate

that their children exhibit more balanced patterns of social development within inclusive environments (Foley-Nicpon, 2013).

- **Home-based learning support:** Parents of gifted children describe assuming an intensive facilitative role through the provision of supplementary learning materials, project-based activities, and interest-driven support in the home environment (Ogurlu, 2016).

Overall, the quality of parental experiences shows a direct correlation with the extent to which an institution has internalized an inclusive education culture. When inclusive practices are robust at the institutional level, family experiences tend to be positive; conversely, when such practices are weak, patterns of dissatisfaction become more pronounced.

d) Challenges Encountered

Parents may face multidimensional challenges throughout the inclusive education process. These challenges commonly include:

- limited access to differentiated instructional strategies that adequately respond to children's unique needs;
- gaps in teachers' knowledge and skills related to gifted education pedagogy;
- inadequacies in physical and pedagogical infrastructure at the institutional level;

- constraints on individualized support due to large class sizes;
- social and emotional difficulties experienced by children and insufficient interventions to address these challenges; and
- disruptions and coordination problems within school–family communication channels.

International research indicates that parents often perceive themselves as occupying the position of "peripheral observers" rather than "active participants" in education, a perception that negatively affects their levels of satisfaction with inclusive education practices (Cross & Cross, 2015).

e) The Contribution of Parental Perspectives to Inclusive Education

The systematic analysis of parental perspectives is of critical importance for improving the inclusive education ecosystem for two primary reasons. First, parental feedback constitutes an authentic and reliable source of data regarding the effectiveness of institutional policies and classroom-level practices. Second, parents' perceptions and attitudes directly shape the phenomenological quality of children's school experiences and their educational outcomes.

Within this framework, it becomes an unavoidable necessity for inclusive education policies to develop participatory and democratic mechanisms that position families as equal and active stakeholders in the educational process.

5.5 Factors Influencing Parental Involvement

Parental involvement is a multilayered phenomenon shaped by reciprocal interactions among families, schools, teachers, communities, and education policies. National and international research indicates that the level of parental involvement is influenced by both micro-level individual and family-related factors and macro-level systemic and cultural variables (Hoover-Dempsey & Sandler, 1997; Epstein, 2011). In the context of gifted students, the impact of these factors becomes even more pronounced, as the educational needs of this group require heightened awareness and collaboration beyond standard practices.

Within this framework, the factors influencing parental involvement can be examined under five main categories.

a) Socioeconomic and Educational Characteristics of the Family

Families' socioeconomic status, educational attainment, and levels of cultural capital are among the most frequently examined determinants of parental involvement. Research demonstrates that families with higher levels of education tend to monitor school processes more closely, establish stronger communication with teachers, and articulate their children's academic needs more accurately (Jung, 2024). These families also appear to be better equipped to advocate for their children's educational rights and to mobilize necessary resources, owing to their deeper understanding of how the education system operates.

For gifted students in particular, access to support programs, the provision of learning materials in the home, participation in specialized activities, and involvement in individualized instructional processes are often contingent upon family resources. Families with greater economic means are able to provide private courses, scientific excursions, technological tools, and enriched learning materials to foster their children's talents, thereby creating significant advantages in the realization of gifted students' potential.

Studies conducted in Türkiye similarly indicate that families with higher socioeconomic status tend to recognize their children's abilities earlier and to seek appropriate forms of support more proactively, whereas in families with lower socioeconomic status such awareness may emerge at a later stage (Çifci & Alkan, 2020). At the same time, cultural capital is not limited to economic resources alone; it also encompasses families' social networks, access to information channels, and educational value systems. In this regard, even families facing socioeconomic disadvantage may demonstrate meaningful involvement by strategically utilizing their limited resources for their children's education when they possess strong educational values.

b) Families' Attitudes Toward Education and School

Families' attitudes toward education, schools, and teachers emerge as one of the strongest predictors of parental involvement behaviors. Hoover-Dempsey and Sandler (1997) identify three primary motivational sources shaping families' decisions to become involved. The first concerns parents' perceptions of their own roles and the sense of responsibility they attribute to these

roles. The second relates to the extent to which they perceive the school and teachers as accessible and supportive. The third involves their belief that involvement will yield tangible benefits for their child's development. Families who hold positive perceptions across these three domains tend to demonstrate significantly higher levels of involvement than those with less favorable perceptions.

In the education of gifted students, families' perceptions of teachers' competence in areas such as talent identification, differentiated instructional strategies, and social–emotional support constitute critical factors influencing motivation for involvement (Neihart, 2006). Trust in schools and teachers is directly associated with families' beliefs that the distinctive needs of their gifted children will be adequately addressed. When such trust is established, families are more likely to position themselves as active partners in the educational process, thereby creating a more productive foundation for school–family collaboration.

c) Teacher Competencies and Family–Teacher Communication

The quality of family–teacher communication represents one of the central determinants of inclusive education processes. Research indicates a positive relationship between teachers' levels of awareness regarding gifted education and families' satisfaction and engagement. When teachers adopt open, empathetic, and collaboration-oriented communication approaches, families are more likely to perceive themselves as competent and valued stakeholders within the educational process (Moon & Reis, 2004). Conversely, teachers'

biases toward gifted students or gaps in their knowledge may foster feelings of distrust and exclusion among families, thereby negatively affecting motivation for involvement (Foley-Nicpon, 2013).

Family–teacher interaction extends beyond the mere exchange of information and constitutes a multidimensional social relationship shaped by mutual respect, recognition, and shared responsibility. The quality of this relationship requires a broad range of competencies, including not only teachers' professional expertise but also their communication skills, cultural sensitivity, and attitudes toward families. Teachers' capacities to recognize the educational needs of gifted students, implement differentiated instructional strategies, and regard families as active partners in these processes are critical to the success of inclusive education.

d) Institutional Structure of Schools and Inclusive Education Culture

Schools' communication policies, the quality of guidance services, family-oriented programs, the availability of enrichment activities, and the overarching vision of inclusive education constitute key institutional factors shaping parental involvement. International research suggests that inclusive school cultures are built upon three fundamental components. The first is a leadership approach that positions families as equal stakeholders. The second involves inclusive education values that are internalized by teachers and reflected in practice. The third consists of sustainable structures that systematize parental involvement, including regular meeting mechanisms, parent education programs, and effective

information systems. When these institutional structures are strong and functional, parental involvement evolves from a sporadic occurrence into a continuous and high-quality process (Epstein, 2011).

In the context of gifted education, the specific opportunities and support mechanisms offered by schools directly influence parental involvement. In Türkiye, Science and Art Centers (Bilim ve Sanat Merkezleri - BİLSEM), operating under the Ministry of National Education, are institutional structures that provide enriched, supplementary education outside regular school settings for gifted students. Practices such as referrals to BİLSEM, enrichment classes, science and arts activities, and project-based learning initiatives not only foster students' potential but also encourage families' active participation in the educational process.

e) Cultural Values and Societal Expectations

Parental involvement is a phenomenon shaped by cultural contexts. In some cultures, families' active engagement with schools is regarded as natural and expected, whereas in others, an excessive respect for school authority may lead families to remain in the background. Studies conducted in Türkiye indicate that, particularly in rural regions, families often perceive teachers as figures of "absolute authority," which makes them more hesitant to participate in shared educational decision-making processes. In contrast, families in more urbanized areas tend to assume a more active and assertive role in their interactions with schools (Sarıkaya & Levent, 2020).

Among families of gifted students, high expectations constitute a general tendency regardless of cultural

structure. However, when these expectations are not aligned with school practices or cannot be reconciled through effective communication, school–family conflicts may emerge (Jung, 2024).

f) Psychosocial Dynamics Within the Family

Micro-level factors such as family functioning, intra-family relationships, parental self-efficacy, available support systems, and levels of stress represent core dynamics that shape the degree of parental involvement. Families with high levels of parental self-efficacy tend to demonstrate more active and sustained engagement in their children's educational processes. Conversely, adverse life events—including family conflict, divorce, economic stress, or health-related challenges—may substantially constrain parental involvement.

The impact of having a gifted child on family dynamics is likewise characterized by considerable complexity. For some families, this experience serves as a source of pride and motivation, whereas for others it brings psychosocial challenges such as heightened anxiety, increased responsibility, and performance-related pressure (Foley-Nicpon, 2013). Within this context, parental involvement should be understood not merely as a phenomenon shaped by external factors, but as a reflection of the complex interplay among intra-family psychosocial processes, parenting experiences, and familial resources.

5.6 Models of School–Family Collaboration and Practical Examples in Inclusive Education

In inclusive education settings, collaboration between schools and families constitutes one of the most

fundamental structures supporting students' learning processes. Particularly in the education of gifted students, the quality of school–family collaboration has a decisive influence on students' academic progress and socio-emotional adjustment. Epstein's (2011) school–family–community partnership framework is among the most frequently cited models in the context of inclusive education, emphasizing that families should be regarded not merely as visitors to schools but as active stakeholders who contribute to decision-making processes and support the sustainability of learning. Similarly, Moon and Reis (2004) underscore that families' participation in educational planning is critical for accurately understanding the individualized learning needs of gifted students.

In practice, one of the strongest indicators of effective school–family collaboration is teachers' establishment of regular, open, and bidirectional communication with families. Such communication is not limited to sharing information about students' academic performance; teachers also convey insights into students' classroom behavior patterns, strengths, areas of difficulty, and social relationships, thereby contributing to a holistic understanding of children's developmental profiles. For example, Jung's (2024) study reports that regular feedback provided by teachers strengthens families' trust in schools and supports parents in offering more informed assistance within the home environment. In practical terms, this approach may be illustrated as follows: when a teacher observes that a gifted student demonstrates particular strengths in project-based learning, the family is informed accordingly; in response, the family may provide research materials aligned with the child's

interests at home. In this way, school–family interaction is directly reflected in students' learning motivation and performance.

Another important dimension of school–family collaboration in inclusive education involves informational programs designed for families. Seminars, workshops, or orientation programs that inform parents about the characteristics of gifted students, their learning pace, attention profiles, and socio-emotional needs enable families to guide their children more effectively. Ogurlu's (2016) study demonstrates that parent education programs enhance parental self-efficacy and promote more informed and active family involvement in children's educational processes. In practice, this may take the following form: when a school organizes a parent seminar on "home-based support strategies" for gifted students, families not only acquire information but also learn how to support their children's self-paced learning at home. This, in turn, contributes to the consistent support of students across both home and school environments.

In inclusive education settings characterized by strong school–family collaboration, teachers actively involve families in the process of defining students' individualized educational goals. Moon and Reis (2004) note that this practice enables a more accurate analysis of gifted students' needs and allows families to provide teachers with critical information regarding children's strengths. For instance, while some students may find it difficult to fully demonstrate their abilities within classroom settings, families can share observations about children's specific interests, curiosity, or advanced

thinking skills manifested at home. Such information assists teachers in determining appropriate classroom differentiation strategies. A collaborative model of this nature facilitates the systematic support of students' potential and reinforces the effectiveness of inclusive education practices.

Practical applications also extend to schools' planning of joint activities with families. Many schools that adopt inclusive education policies implement collaborative projects within the teacher–family–student triad. A concrete example of this approach is the inclusion of families in students' scientific project processes. Epstein (2011) emphasizes that such forms of collaboration enhance both students' academic and social motivation, while enabling families to feel more closely connected to their children's school experiences. For instance, when a gifted student is engaged in a scientific research project and the family participates not merely as an observer but as a partner who seeks to understand the child's interests and provides logistical support, both the quality of the project and the student's overall learning experience are strengthened.

School–family collaboration in inclusive education settings also encompasses an important emotional dimension. The quality of families' relationships with schools is closely linked to the extent to which they perceive themselves as "valued" and "heard" stakeholders. Foley-Nicpon (2013) notes that when families develop relationships of trust with teachers, both their sense of school attachment and their motivation to support their children's educational processes increase. Accordingly, many schools conceptualize parent–teacher

meetings not solely as mechanisms for problem-solving, but as opportunities to share students' developmental narratives and to establish common goals. In practice, this approach is reflected when teachers frame parent meetings not merely as evaluations of students' grades, but as dialogical spaces in which students' interests, social relationships, observed behavioral patterns, and modes of self-expression are discussed. Such forms of communication enable schools and families to align their perspectives and expectations.

In sum, school–family collaboration occupies a central position in inclusive education and represents a process that must be structured deliberately, continuously, and reflectively rather than treated as a purely supportive element. In the context of gifted students, this collaboration plays a fundamental role in identifying learning goals, planning differentiated instruction, and supporting students' social and emotional development. As emphasized in the literature (Epstein, 2011; Jung, 2024; Moon & Reis, 2004), effective models of school–family collaboration enhance the overall quality of inclusive education and contribute significantly to the optimal support of students' potential.

5.7 General Evaluation and Discussion

Within the inclusive education paradigm, parental involvement is positioned not only as a supportive element but also as a directly determining variable in relation to the developmental trajectories of gifted students. The literature systematically documents that the quality of family–teacher collaboration exerts a substantial influence on students' academic achievement, socio-emotional adjustment, and motivation for learning

(Epstein, 2011; Moon & Reis, 2004). In this respect, findings related to parental involvement should be examined across a broad spectrum ranging from micro-level interpersonal interactions to macro-level policy and cultural contexts.

Parental involvement emerges foremost as a multidimensional and dynamic phenomenon. Families' perceptual frameworks and expectations regarding education, parental self-efficacy, socioeconomic status, teachers' strategies for engaging families, the degree to which schools have internalized inclusive education cultures, and broader societal conceptions of education collectively shape the quality of parental involvement (Hoover-Dempsey & Sandler, 1997; Sarıkaya & Levent, 2020). When these variables interact synergistically, families tend to demonstrate meaningful, informed, and sustainable engagement in educational processes. Conversely, when families perceive themselves as marginalized or undervalued, parental involvement systematically weakens.

An examination of empirical findings concerning families of gifted students indicates that parental involvement within this group exhibits both greater intensity and a more complex structural pattern. Gifted students require differentiated instructional strategies due to their accelerated learning capacities, deeply developed areas of interest, and heightened sensory sensitivities. Within this framework, families play a critical role by establishing effective communication networks with teachers and by recognizing and supporting their children's needs within the home environment (Ogurlu, 2016). Jung's (2024) comprehensive study reveals that

families of gifted children tend to hold high expectations; however, when these expectations are perceived as unmet by schools, patterns of parental frustration, anxiety, or distrust may emerge. Consequently, parental perspectives function not merely as indicators of satisfaction but as critical feedback mechanisms reflecting the quality of inclusive education.

When focusing on the nature of the relationship between parental involvement and student achievement, it becomes evident that this relationship is not unidirectional but rather characterized by reciprocal reinforcement. While students' school experiences directly influence families, the quality of families' relationships with schools simultaneously shapes students' academic motivation. Indeed, Neihart's (2006) in-depth analyses document that the social and emotional development of gifted students is highly sensitive to levels of support within the family environment, and that communication between families and schools serves a protective function, particularly in addressing psychosocial challenges such as perfectionism, anxiety, and social isolation. This evidence underscores that parental involvement supports not only academic success but also the preservation of students' psychological well-being.

Analyses of practice-oriented examples in inclusive education further demonstrate that when parental involvement is confined to informational meetings alone, it fails to produce the anticipated transformative effects. In contrast, processes tend to be far more effective when an egalitarian relationship is established between teachers and families—one that acknowledges mutual expertise.

Epstein's (2011) conceptualization of the "partnership" model assumes central importance in this regard. While families contribute insights into children's behavior patterns at home, deepened interests, and developmental cues, teachers provide critical information concerning academic performance, classroom dynamics, and social interaction styles. When these complementary knowledge domains are integrated, the resulting learning environment becomes more holistic and inclusive.

When the evidence presented in the preceding sections of this study is evaluated from a holistic perspective, it becomes clear that the role of parental involvement in inclusive education extends well beyond the provision of support, instead emerging as a strategic determinant of the quality of learning environments. This strategic role is particularly pronounced in the context of gifted students. Teachers' capacity to implement educational adaptations, apply differentiated instruction, and address students' social and emotional needs is heavily dependent on information provided by families. Accordingly, the quality of school–family collaboration offers a powerful indicator of whether gifted students are rendered "visible" within inclusive education and the extent to which their educational needs are adequately met.

Another critical dimension of the discussion concerns the necessity of involving families in inclusive education processes at the policy and systemic levels. International educational frameworks (UNESCO, 2020) define parental involvement as a central component of inclusive education policy, while, within the Turkish context, regulations issued by the Ministry of National Education regarding guidance services, identification processes, and

family education similarly aim to strengthen family participation. Nevertheless, when school–family collaboration is not supported by a robust culture of inclusion in practice, parental involvement tends to remain superficial, resulting in critical gaps in meeting the needs of gifted students.

In conclusion, parental involvement should be understood not as a peripheral addition within inclusive education but as a central and indispensable component for addressing students' developmental needs in a holistic manner. In the context of gifted students, the quality of school–family relationships plays a decisive role in optimizing students' potential, meeting their social and emotional needs, and fostering intrinsic motivation for learning. The literature clearly demonstrates that the inclusion of families in inclusive education processes constitutes a fundamental requirement from pedagogical, psychosocial, and policy perspectives alike (Epstein, 2011; Jung, 2024; Ogurlu, 2016). Therefore, for inclusive education policies to generate transformative outcomes for all students, parental involvement must be structured systematically, functionally, and within an egalitarian framework.

5.8 Practical Strategies for Strengthening Parental Involvement in Inclusive Education

In light of the theoretical framework, empirical findings, and analyses of parental perspectives presented in the preceding sections, the need to articulate applicable and sustainable strategies for strengthening parental involvement in inclusive education becomes evident. The sustainable and effective implementation of inclusive education approaches requires that families be incorporated into the educational process not merely as

supportive elements, but as equal and active partners. Particularly in the education of gifted students, parental involvement holds strategic importance in ensuring the accurate recognition of students' individual characteristics, the holistic consideration of their learning needs, and the support of their social and emotional development. Within this context, practical and structured strategies that can be implemented by school administrators, teachers, and policymakers directly influence the quality of inclusive education.

The recommendations presented in this section have been developed in accordance with contemporary school practices, effective parental involvement models identified in the literature, and the core principles of inclusive education. They aim to strengthen school–family collaboration and to establish sustainable mechanisms for meaningful parental participation.

a) Strategies That Can Be Structured at the School Level

School-level strategies are designed to ensure that parental involvement is not confined to individual efforts but is instead embedded within a planned, traceable, and sustainable institutional framework. These strategies encompass organizational arrangements that define responsibilities related to parental involvement within the school structure, regulate communication channels, and facilitate families' active participation in educational processes.

Family Involvement Coordinator Model

The establishment of a "family involvement coordinator" mechanism within schools to systematically plan and implement parental involvement enhances both the continuity and quality of school–family communication. This role may be assumed by school counselors or teachers with expertise in inclusive education. The coordinator functions as an intermediary by analyzing the educational, psychosocial, and guidance-related needs of families of gifted students and directing them to appropriate support services. Such a structure relocates parental involvement from individual initiative to an institutional foundation.

Effective Use of Digital Communication and Monitoring Systems

Digital communication tools widely used by schools today offer significant opportunities for sustaining parental involvement. Through e-portfolio systems, school management information systems, and secure digital communication platforms, families are able to regularly monitor students' academic progress, project processes, and individual learning goals. Sharing enrichment activities, research projects, and individualized learning experiences designed for gifted students through these platforms enables families to participate in the process in a more informed and meaningful manner.

Planned and Structured Family Counseling Hours

Transforming family–teacher meetings from ad hoc encounters into interactions conducted according to a structured plan enhances the quality of communication. When teachers hold one-to-one meetings with families within designated "family counseling hours" on a weekly or monthly basis, opportunities are created for reciprocal exchange of information regarding students' academic development, social and emotional status, and individual needs. Meetings conducted through an appointment-based system strengthen families' perceptions of school accessibility and, in turn, increase their motivation for involvement.

Parent Education and Awareness Workshops

One of the fundamental elements that strengthens parental involvement in inclusive education is the enhancement of parents' knowledge and awareness. Periodic parent workshops may address topics such as the developmental characteristics of gifted children, enrichment of home learning environments, perfectionism and stress management, home-based support for STEM-oriented learning processes, and the promotion of social and emotional development. Beyond providing information, such workshops contribute to the formation of social support networks among families through opportunities for shared experiences and peer exchange.

Family-to-Family Mentoring and Support Networks

Mentoring models in which experienced families guide those newly entering the process are gaining increasing importance in inclusive education practices. Support networks established among families of gifted students help reduce uncertainty and facilitate families' adaptation to educational processes. This experience-sharing structure strengthens families' sense that they are not alone and contributes to the continuity of parental involvement.

b) Practices Related to Classroom Instruction and Teaching Processes

Practices related to classroom instruction and teaching processes aim to directly strengthen the pedagogical dimension of parental involvement. Approaches developed within this framework enhance the transparency of instructional processes, enabling families to gain a deeper understanding of students' learning experiences and to contribute actively to the sharing of educational goals. Structuring interactions among teachers, students, and families in an integrated manner within instructional processes emerges as a key factor in improving the quality of parental involvement.

Learning Contracts and Joint Goal Setting

Learning contracts prepared at the beginning of the academic year by teachers, students, and families clearly define students' individual goals, the academic support to be provided by teachers, and the responsibilities assumed by families within the home environment. This approach transforms parental involvement from an abstract

expectation into a structured process grounded in clearly defined responsibilities.

Family-Inclusive Classroom Observation and Interaction Days

Classroom observation days organized at regular intervals enable families to become closely acquainted with instructional processes. This practice allows parents to observe their children's learning behaviors within the classroom context and to gain a deeper understanding of instructional strategies. Particularly for gifted students, such activities foster parental awareness of classroom interactions and function as an effective tool for strengthening school–family communication.

c) Approaches to Strengthening Home–School Connections

An effective and sustained connection between home and school plays a decisive role in enhancing the qualitative dimension of parental involvement. Approaches developed within this context aim to ensure that learning is not confined solely to the school environment, but that the home is also structured as a planned and supportive learning space. Practices that strengthen home–school interaction enable families to participate more consciously in pedagogical processes while contributing to the holistic support of students' learning experiences.

Home-Based Learning and Enrichment Packages

Home-based learning packages designed according to students' areas of interest and talent support families' active participation in the educational process. These packages may include research tasks, experimental kits, problem-solving activities, and creative thinking exercises. Learning activities conducted in the home environment contribute to the deepening and consolidation of knowledge acquired at school.

Family-Inclusive Digital Portfolio Systems
When families share their children's academic and creative work completed at home with teachers through digital portfolios, the assessment process becomes more comprehensive and holistic. This system enables the monitoring of students' development beyond classroom performance alone, providing a richer and more continuous picture of their learning trajectories.

d) Evaluation, Monitoring, and Feedback Mechanisms

The sustainability and quality of parental involvement are directly linked to the existence of systematic evaluation, monitoring, and feedback mechanisms. Practices developed in this direction aim to ensure the holistic monitoring not only of students' academic outcomes, but also of learning processes, developmental needs, and the quality of school–family interactions. Structuring evaluation and feedback processes enhances families' awareness of educational processes while simultaneously enabling schools to continuously review and improve their practices.

Development-Oriented Holistic Reporting

Developmental reports prepared on a quarterly or semester basis should be structured to encompass students' strengths, areas for growth, and social and emotional status in addition to academic achievement. Such reports support families in interpreting their children's educational trajectories more accurately and comprehensively.

Family Feedback and Satisfaction Assessments

Regularly solicited feedback from families constitutes an important source of data for evaluating and strengthening the quality of school–family collaboration. Feedback gathered through surveys and focus group discussions contributes to the ongoing refinement and improvement of inclusive education practices.

In conclusion, these practical recommendations for strengthening parental involvement in inclusive education aim to move school–family collaboration beyond individual initiatives and to establish an institutional and sustainable framework. The strategies presented herein are adaptable across different school types, socio-cultural contexts, and education systems, offering a flexible and scalable roadmap for enhancing parental involvement within inclusive education practices. In the context of gifted students, the informed and active participation of families in educational processes makes a substantial contribution to supporting students' potential at the highest level and to strengthening the overall quality of inclusive education.

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CHAPTER 6

POLICY APPROACHES IN INCLUSIVE GIFTED EDUCATION: DIGITALIZATION, ARTIFICIAL INTELLIGENCE, AND FUTURE PERSPECTIVES

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Introduction

The intersection of inclusive education and educational support for gifted students stands out as one of the most contentious yet productive domains in contemporary education policy. For many years, gifted education has predominantly been addressed through separation, acceleration, and specialized programs. While this approach has yielded certain gains in developing the cognitive capacities of these students, it has also been subject to criticism regarding its relationship with principles of educational equity and social integration. Conversely, the growing strength of the inclusive education paradigm is bringing back to the agenda the question of how all exceptional learners—not just disadvantaged groups—can be supported within shared learning environments. This transformation necessitates the redesign of learning processes in ways that are sensitive to individual differences; particularly in a context where digital technologies and artificial intelligence are rapidly advancing, it opens established assumptions about the fundamental nature of teaching and learning to scrutiny (Siegle, 2024).

The digital transformation experienced in education in recent years has gained momentum largely due to global developments that necessitated rapid adaptation to remote and hybrid learning models (Stalmach, et.all, 2024) . This process has not only made visible the opportunities offered by technology-supported instruction but has also rendered its pedagogical, ethical, and structural limitations more apparent. It has been observed that standardized digital solutions may prove inadequate, particularly for students whose learning rates, cognitive

depths, and developmental patterns diverge from statistical averages. In this context, gifted students—characterized by advanced cognitive abilities, rapid learning tempos, and frequently asynchronous developmental profiles—represent a student population that can meaningfully benefit from the adaptive and personalizable structures of artificial intelligence-based systems. Nevertheless, the translation of this potential into educational value requires not only technological capacity but also ethical responsibilities, pedagogical consistency, and a holistic approach at the policy level.

This chapter aims to critically examine policy approaches centered on digitalization and artificial intelligence use in the context of inclusive gifted education. Drawing upon international comparative analyses and current research findings, it reveals how different countries and systems attempt to reconcile technology integration with principles of equity and inclusion. Within this framework, the opportunities offered by intelligent tutoring systems, adaptive learning platforms, and data-driven personalization applications are discussed, alongside structural and ethical concerns regarding data privacy, algorithmic bias, and the preservation of human relationships in educational processes. Thus, the chapter aims to provide a holistic perspective that addresses the role of artificial intelligence in creating inclusive learning environments for gifted students not merely as a technological innovation but also within the context of policy, values, and a human-centered understanding of education.

Theoretical Foundations: Inclusive Education and Giftedness in the Digital Age

The digital age has compelled education systems to rethink not only the tools they employ but also their fundamental assumptions about learning and the learner. In this new context, where the speed of knowledge production and circulation has increased and learning resources have transcended spatial and temporal boundaries, the fundamental purpose of education is increasingly being defined as the elicitation and sustainable development of individual potential. This transformation removes inclusive education from being an approach limited to merely physical or administrative arrangements and places it at the center of pedagogical design. Particularly, the ability of students with different cognitive profiles to have meaningful learning experiences in the same learning environments necessitates the development of theoretically more flexible and multidimensional frameworks.

The concept of giftedness is also moving away from being a characteristic defined solely by high academic performance or standardized assessment instruments in this context; it is being addressed as a developmental, contextual, and dynamic phenomenon. Contemporary theoretical approaches emphasize that giftedness emerges through the individual's interaction with their environment and that potential may not develop sufficiently when appropriate educational conditions are not provided. This situation requires that inclusive education and gifted education be treated not as mutually exclusive approaches but rather as two approaches that complement each other. In the digital age, this need for

integration has become even more pronounced; technological capabilities have offered the possibility of moving differentiation and personalization practices from the theoretical level to practical applications.

The emergence of artificial intelligence-based learning systems represents a significant turning point is evaluated asthat redefines the relationship between inclusive education and gifted education (Yang et. all, 2021). These systems, capable of continuously analyzing learner data, dynamically adjusting feedback processes, and adapting learning content to individual needs, have the potential to transcend the limitations of traditional instructional models. In this context, the theoretical foundations of the digital age are based on approaches that treat learning not as the transmission of fixed content but as an interactive and developmentally open process sensitive to the characteristics of the learner. Inclusive gifted education emerges precisely at this point as a field that needs to be reconsidered with the opportunities offered by digitalization and artificial intelligence.

Reconceptualizing Inclusivity for Exceptional Learners

The concept of inclusive education has undergone a significant transformation in meaning, scope, and application since it first appeared in international policy documents. Initially developed primarily as a response to the marginalization of students with disabilities within education systems, the inclusive education approach has evolved over time into an understanding that addresses learner diversity within a more holistic framework. Current inclusive education theories acknowledge that students cannot be classified through singular categories

in terms of ability, interest, learning rate, and learning preferences; rather, these characteristics are distributed across multiple continuums. This perspective necessitates that education systems design instructional processes in ways sensitive to this diversity rather than expecting all students to adapt to the same teaching methods (UNESCO, 2020).

Within this expanded understanding of inclusivity, gifted learners often occupy a dual and paradoxical position. On one hand, their advanced cognitive capacities and high academic performance can create the impression that these students progress without difficulty within standard instructional programs, thereby preventing their learning needs from becoming sufficiently visible. On the other hand, research findings clearly demonstrate that gifted students can experience low motivation, academic regression, and socio-emotional adjustment problems when not provided with appropriately challenging cognitive stimulation and differentiated learning experiences (Çitil, 2018). In this context, the fundamental test of inclusive education policies is to position differentiation for gifted learners not as a privilege or elitist practice but as an integral dimension of educational equity.

The Universal Design for Learning (UDL) approach provides a robust theoretical foundation for this reconceptualization process. UDL adopts as its fundamental principle the provision of multiple options in engagement with learning, representation of information, and learners' means of expression; thus making it possible to support students with different learning profiles within the same learning environment. For gifted learners, UDL

offers a framework that allows for flexible arrangement of the depth, complexity, and presentation format of learning content. Digital technologies, and particularly artificial intelligence-supported adaptive learning systems, enable large-scale application of UDL principles by dynamically adjusting content difficulty, learning pace, and modalities used through their capacity to continuously analyze individual learner characteristics (Gottschalk ve Weise 2023). In this respect, artificial intelligence is considered an important tool that can reduce the historical tension between inclusive education and gifted education.

The Three Pillars of AI-Supported Gifted Education

Siegle (2024) proposes a holistic framework that addresses talent development through three fundamental components to systematically understand the potential contributions of artificial intelligence in gifted education: academic acceleration, depth and complexity in learning, and interest-based exploration. This tripartite structure is noteworthy for relating the fundamental intervention areas long discussed in gifted education to the functional capacity of artificial intelligence. At the same time, the fact that each pillar requires different pedagogical priorities, implementation challenges, and forms of human-technology interaction makes this model functional not only for instructional design but also for education policy and system-level decision-making processes.

Academic acceleration is considered one of the educational interventions with the strongest empirical evidence for gifted learners. Artificial intelligence-supported adaptive learning systems have the capacity to

precisely analyze the student's current knowledge level and conceptual mastery, thereby advancing the learning process at an individual pace. Through these systems, students can be directed to more advanced and challenging content without having to spend unnecessary time reviewing competencies they have already acquired. Thus, acceleration is not limited to structural solutions such as grade skipping but can be applied in a flexible and sustainable manner within daily instructional practice. This approach also significantly reduces the logistic and pedagogical complexity created by simultaneously managing multiple learning pathways within the same classroom or school—one of the most significant barriers to acceleration in traditional educational settings.

The second pillar, depth and complexity in learning, focuses on the quality of learning experiences rather than quantitative progression in gifted education. Gifted learners need not only faster but also deeper, multidimensional, and critical learning opportunities. For these students, learning is a process that includes comparing different perspectives, analyzing patterns and relationships, making abstractions, and thinking interdisciplinarily rather than reaching a single correct answer. Systems equipped with natural language processing and generative artificial intelligence capabilities can provide open-ended questions, discussion scenarios, and enriched resources to support such cognitive processes. Furthermore, artificial intelligence can detect when students remain at a superficial level or become stuck at a certain threshold of thinking, and can develop structured feedback and scaffolding strategies that support the transition to higher-order cognitive processes (Bahar, 2024).

The third pillar, interest-based learning, centers on the tendency of gifted students to develop intense curiosity and passion toward specific areas. Research demonstrates that learning experiences that align with these students' individual areas of interest play a determining role in motivation, persistence, and deep learning. Artificial intelligence-based recommendation systems, similar to algorithms widely used in entertainment and commerce, can analyze students' interest patterns and adapt them to educational content. In this way, students can be directed to resources, experts, and peers with similar interests related to their own areas of interest. The interest-based exploration approach serves a particularly inclusive and equalizing function for gifted students in small-scale schools or rural areas who have limited access to in-depth programs and expert support in certain fields.

International Policy Landscape: A Comparative Analysis

The integration of digitalization and artificial intelligence into education systems has led to the emergence of different policy approaches in accordance with countries' historical educational traditions, governance structures, and understandings of equity. In this context, international comparative analysis reveals that artificial intelligence-based education policies are not merely technical solutions; rather, they are shaped around values, priorities, and educational purposes. Particularly, policies developed at the intersection of inclusive education and gifted education are significant in demonstrating how different countries attempt to balance supporting individual potential with ensuring equity in education. The comparative perspective presented in this section

aims to make visible the common trends and divergent aspects of policy frameworks developed in different jurisdictions, thereby laying the groundwork for drawing implications for artificial intelligence-supported policy design for inclusive gifted education.

Policy Development in the United States

The United States has experienced notable activity in policy development regarding the use of artificial intelligence in education in recent years. Steps taken at the federal level, in particular, indicate that artificial intelligence is being addressed not merely as a technical innovation but as a strategic tool for human resource development. The executive order titled "Advancing Artificial Intelligence Education for American Youth," issued in April 2025, envisaged the establishment of the White House AI Education Task Force, demonstrating that preparing young generations for a future intertwined with artificial intelligence has become a national priority. This initiative positions artificial intelligence both as a subject of instruction and as a tool for improving instructional processes; it explicitly identifies gifted and talented learners as one of the student groups that can most benefit from personalized and adaptive instruction (U.S. Department of Education, 2025). In this sense, federal policy shows a tendency to address inclusivity and the development of high potential within the same framework.

Despite this strategic direction at the federal level, policy implementations across states are not homogeneous. As of April 2025, at least 28 states have reportedly published guidance documents regarding the use of artificial intelligence in K-12 educational settings; however, the

scope of these documents and the space allocated to gifted learners vary significantly among states. Some states, such as Kentucky, have developed more detailed pedagogical frameworks distinguishing between AI-oriented, AI-assisted, and AI-enhanced learning approaches in terms of student agency, teacher roles, and learning processes. In contrast, other states have focused predominantly on data privacy, ethical use, and security issues in their policy documents, largely leaving the shaping of instructional applications to the initiative of local governments and schools (Education Commission of the States, 2025). This situation indicates that artificial intelligence-based education policies in the United States are being balanced between a central vision and local autonomy.

Among state-level implementations, the STELLAR framework developed by the Nevada Department of Education stands out as one of the leading examples in terms of inclusive policy development. Centering on the principles of Safety, Transparency, Empowerment, Learning, Leadership, Achievement, and Responsible Use, this framework not only promotes technological innovation but also adopts the protection of students and educators as a fundamental policy objective. Particularly, the inclusion of a Student Voice Group in the process demonstrates that the learner perspective is being taken into account during the policy development phase; this approach provides an important example that artificial intelligence policies can be shaped through multi-stakeholder and participatory processes rather than merely top-down regulations. From this perspective, the STELLAR framework can be considered a balanced

policy model that addresses innovation and ethical responsibility together.

Table 1. Comparative Analysis of AI Policy Approaches in Education

Jurisdiction	**Policy Framework**	**Gifted Education Focus**	**Key Features**
USA (Federal)	Executive Order, Supplemental Priorities	Explicit inclusion in priority areas	AI literacy, personalized instruction
European Union	DigCompOrg, Digital Education Action Plan	Within broad inclusivity framework	Digital competence, equity, institutional capacity
Türkiye	AI Policy Document 2025-2029, BİLSEM System	Specialized institutional structure	Human-centered approach, ethical AI, data security
Nevada (US State)	STELLAR Framework	Personalization for all learners	Student voice, stakeholder participation

Source: Compiled by the author based on policy document analysis.

European Approaches to Digital Equity and Inclusion

The European Union has adopted a normative approach that largely addresses the integration of digital technologies into education systems along the axes of equity, accessibility, and competence development (European Commission, 2022). In this approach, digitalization is viewed not merely as a technical tool that modernizes instructional processes but as a structural transformation area that can strengthen the inclusivity capacity of education systems. The DigCompOrg framework developed within this context provides a holistic structure aimed at assessing the extent to which and under what conditions schools and educational institutions can use digital technologies for pedagogical purposes. DigCompOrg particularly focuses on how digital tools can support inclusive instructional practices, thereby bringing the development of digital capacity at the institutional level onto the policy agenda.

Empirical studies conducted across multiple European countries through the SELFIE assessment tool have revealed significant differences in digital readiness levels among schools. These findings indicate that the dissemination of artificial intelligence-supported learning applications, if carried out without considering existing digital inequalities, may produce new forms of inequality. The study by Bešić and Holzinger (2024) demonstrates that the interaction between digital infrastructure, teacher competencies, and institutional leadership is determining in the success of inclusive digital applications; it emphasizes that not only access to technology but also

institutional and pedagogical readiness is critical for the equitable implementation of artificial intelligence-based learning.

One of the distinguishing aspects of the European perspective is that it does not limit digital inclusion narrowly to hardware and connectivity access. This approach treats the development of digital competencies of teachers and school administrators, alongside students, as a fundamental component of inclusive education policies. This holistic perspective, frequently emphasized in European Union policy documents, is based on the assumption that interventions focused solely on device provision may deepen rather than reduce educational inequalities when not supported by pedagogical capacity development. In the context of gifted education, this approach reveals that what is determining is not the presence of artificial intelligence-based tools but rather teachers' competence to use these tools consciously and critically for differentiation, enrichment, and personalization purposes. Accordingly, the European approach positions artificial intelligence not as a mechanism that replaces pedagogical decisions but as a tool that supports the professional judgment of educators.

The Türkiye Context: BİLSEM and Digital Transformation

Türkiye presents a unique and instructive context for examining the intersection of gifted education policies and digital transformation processes. Within the Turkish education system, Science and Art Centers (BİLSEM) stand out as the primary institutional structure established for the identification and support of gifted students; they provide complementary and enriching learning

environments in which students participate alongside their formal education. Operating under the Ministry of National Education, these centers demonstrate that the education of gifted individuals is addressed not only as an individual need but also as a strategic area of human resource development, and they are consistently expanding nationwide in this direction (Akgündüz, 2023). This institutional structure serves an important pilot function for the integration of digitalization and artificial intelligence-based applications into gifted education.

The AI Policy Document in Education and 2025-2029 Action Plan published by the Turkish Ministry of National Education presents a holistic vision regarding the integration of digital transformation into the education system. Developed in alignment with the Türkiye Century Education Model, this document addresses artificial intelligence integration not merely as a technological innovation but as a systemic transformation element aimed at enhancing the quality of instructional processes. The policy document identifies AI literacy, development of instructional materials, improvement of assessment and evaluation systems, career guidance processes, and data-driven decision-making mechanisms as priority areas. Particularly, the emphasis on a human-centered approach indicates that artificial intelligence is positioned not as a structure that replaces the teacher but as a tool that supports and strengthens teacher expertise. In addition, the strong emphasis on ethical principles and data security points to Türkiye's adoption of a protective and cautious approach in artificial intelligence policies (MEB, 2025).

Current research on the use of digital technologies in BİLSEM environments reveals both significant opportunities and structural limitations regarding implementation (Sak et.all, 2010). Teachers working in these centers are aware that the high curiosity levels and quest for innovation of gifted students cannot always be adequately met through traditional teaching methods and generally have a positive attitude toward digital and interactive technologies. Studies examining the applicability of digital reality technologies such as augmented reality and virtual reality in BİLSEM environments have shown that teacher attitudes are largely positive. Nevertheless, these studies also reveal the need for targeted professional development programs for teachers, infrastructure investments, and clearer policy guidance to direct implementation for technology to be used effectively and sustainably (Sak et.all, 2010).

In this context, the Türkiye example demonstrates that having a strong institutional infrastructure for gifted education is not alone sufficient for the effective realization of digital transformation. For artificial intelligence and digital technologies to translate into inclusive and quality learning experiences in the BİLSEM context, it is contingent upon ensuring strong coordination between national policy documents and local implementations, systematically supporting teacher competencies, and integrating implementation-oriented research findings into policy-making processes. In this sense, Türkiye presents an important example that allows for the simultaneous observation of both the possibilities and limitations of artificial intelligence-supported transformation in inclusive gifted education.

Intelligent Tutoring Systems and Adaptive Learning: Technical Foundations and Educational Applications

Understanding the educational impact of artificial intelligence-supported learning environments requires addressing both the technical architecture upon which these systems are based and their pedagogical functions together. Intelligent tutoring systems and adaptive learning platforms, with their structures aimed at continuously analyzing learner data and adapting instruction to individual needs, hold special importance for inclusive gifted education. This section addresses the fundamental technical components of these systems and their functions reflected in educational applications; it particularly discusses the opportunities they offer for the identification, differentiation, and sustainable support of gifted learners (Spitzer, et. all, 2023).

Architecture of Intelligent Tutoring Systems

Intelligent Tutoring Systems (ITS) are systems whose developmental roots extend to the 1970s and are regarded as one of the oldest and most mature applications of artificial intelligence in education. The fundamental starting point of these systems is the goal of replicating the powerful effect of one-on-one human tutoring on learning through scalable and sustainable technological solutions. Indeed, numerous studies have demonstrated that individual feedback, immediate adaptation, and sensitivity to learner characteristics can produce higher learning outcomes compared to traditional classroom instruction. Intelligent tutoring systems aim to structure the learning process by supporting these pedagogical advantages through algorithmic and data-driven mechanisms.

The architecture of an ITS generally consists of four fundamental and interacting components. The domain model represents the conceptual structure of the knowledge and skills to be taught; the student model dynamically tracks the learner's current knowledge level, rate of progress, and possible misconceptions. The tutoring model determines which pedagogical strategies are to be applied when and how; the user interface constitutes the component that enables interaction between the learner and the system and directly affects the quality of the learning experience. This architectural structure demonstrates that learning is treated not as static content transmission but as a dynamic process requiring continuous feedback and adaptation.

The student model component holds central importance particularly in applications with gifted learners. Since traditional assessment and evaluation tools are mostly designed based on typical developmental levels, they may prove inadequate in differentiating among high-performing students, giving rise to a limitation known as the "ceiling effect." This situation can cause the learning gaps or developmental needs of gifted students in certain areas to become invisible. Advanced ITS platforms address this issue by dividing learning domains into very small and detailed knowledge components. Through this approach, termed fine-grained or even "nano-level knowledge decomposition" in some studies, conceptual deficiencies or sub-areas requiring support can be precisely detected even in students who outwardly appear homogeneously advanced. This feature makes ITS powerful diagnostic and guidance tools for gifted education.

The rapid developments in deep learning and natural language processing in recent years have significantly expanded the functionality of intelligent tutoring systems. Current ITS applications are not limited to predefined multiple-choice interactions but can interpret open-ended student responses and engage with learners through more natural language. These systems make the learning process more flexible and personalized by generating explanations, examples, and feedback adapted to the student's needs. While these developments bring ITS even closer to the pedagogical sensitivity of human teachers, it is also acknowledged that there remain significant limitations, particularly in areas such as emotional attunement, sustaining motivation, and establishing learner-teacher relationships. For this reason, intelligent tutoring systems should be evaluated not as structures that replace human teachers but as complementary tools that support and enrich instructional processes.

Personalization Mechanisms and Their Relationship to Gifted Education

Adaptive learning systems utilize multiple interconnected personalization mechanisms simultaneously to regulate instruction according to individual learner characteristics. These mechanisms yield particularly pronounced pedagogical outcomes for gifted learners who exhibit heterogeneous characteristics in terms of learning rates, cognitive depths, and areas of interest. In traditional instructional settings, instructional tempo and content sequencing, often fixed according to grade level, prove either insufficiently challenging for these students or create unnecessary repetition in the learning process.

Adaptive systems aim to transcend this limitation by centering the learner's individual learning patterns.

Content sequencing algorithms, as one of the fundamental components of personalization, detect the knowledge and skills the learner has already mastered and reorganize the instructional process accordingly. These algorithms prevent learners from dwelling for extended periods on competencies they have previously acquired while also ensuring that prerequisite knowledge is sufficiently established before new concepts are introduced. For gifted students who typically acquire fundamental knowledge rapidly, this approach enables more efficient use of time spent in the learning process and allows cognitive energy to be directed toward genuinely new and challenging content. Thus, acceleration transforms from a superficial increase in tempo to a pedagogically grounded form of progression.

Difficulty adjustment is another critical personalization mechanism offered by adaptive learning systems. Rather than presenting all students with tasks at the same level, systems can dynamically regulate the difficulty level of tasks based on the learner's performance and responses. Research grounded in flow theory in learning demonstrates that learner engagement reaches its peak when task difficulty slightly exceeds the current skill level without creating excessive cognitive load. For gifted learners who often find standard curricula insufficiently challenging, artificial intelligence systems capable of continuously adjusting difficulty levels upward make cognitive stimulation sustainable and keep interest in learning alive. This situation creates an effect that

supports both academic deepening and long-term learning motivation.

Interest-based personalization adds an important dimension to adaptive learning systems by incorporating the affective and motivational aspects of the learner. Areas of interest, identified through the analysis of students' explicit preferences as well as their interaction and engagement patterns, allow abstract academic concepts to be presented in more meaningful contexts for students. For example, personalized story problems used in mathematics instruction can increase both problem-solving speed and accuracy by relating mathematical concepts to themes the student is interested in. For gifted learners, for whom areas of interest often become the driving force of intellectual development, such contextualization enables learning to transform from a superficial activity into an in-depth exploration process. In this respect, interest-based personalization plays a determining role not only in learning outcomes but also in the learner's subjective experience of learning.

Data Infrastructure, Privacy, and Ethical Considerations

Artificial intelligence-supported instructional systems largely base their personalization and adaptation processes on student data. This situation brings significant risks regarding privacy, data security, and ethical responsibilities alongside the opportunities offered by learning analytics (Lin ve Mubarok, 2021). Particularly for groups such as gifted students whose detailed cognitive profiles are analyzed, it must be clearly defined for what purposes data is collected, how it is processed, and by whom it is accessed. Otherwise,

systems intended to support learners may transform into opaque and supervisory structures. For this reason, the principles of data minimization, explicit consent, accountability, and human oversight must constitute the fundamental ethical framework in artificial intelligence-supported educational applications.

Learning Analytics and Educational Data Mining

Artificial intelligence-supported education systems rely intensively on learner data to personalize and adapt instruction. Learning analytics offers opportunities for early intervention, personalized feedback, and program improvement through the collection and analysis of data regarding students' performance, interaction, and learning patterns. In the context of gifted education, these approaches can contribute to identifying students whose potential remains hidden and evaluating the effectiveness of differentiated interventions. Nevertheless, the collection and use of educational data also brings significant ethical concerns such as privacy violations, data security risks, and the reproduction of algorithmic biases. For this reason, policy frameworks must address the gains offered by data-driven personalization in balanced fashion with principles of explicit consent, transparency, and equity.

Algorithmic Bias and Equity Concerns

The promise of artificial intelligence to provide equitable, personalized education is confronted by the reality that AI systems can embed and amplify human biases. If educational data reflects historical patterns of unequal identification or differentiated educational opportunity, models built on this data may reproduce these inequalities

in their recommendations and decisions. For gifted education, where identification has historically been characterized by significant demographic disparities, this concern is particularly acute.

Addressing algorithmic bias requires multifaceted approaches. Technical strategies include auditing algorithms for performance that differs across demographic groups, incorporating fairness constraints into model training, and intentionally diversifying training data. However, technical solutions alone are insufficient. Education systems must also critically examine the constructs being measured and the values embedded in optimization targets. An algorithm that efficiently identifies students who will succeed in existing gifted programs may be perpetuating narrow conceptions of giftedness; a more ambitious approach would develop systems that recognize diverse forms of exceptional ability and potential.

Human-AI Collaboration in Educational Contexts

A recurring theme in policy discussions about artificial intelligence in education is the importance of maintaining human agency and the irreplaceable role of human educators. This perspective does not diminish the potential contributions of artificial intelligence but rather positions them within a broader understanding of education as a fundamentally human endeavor involving relationships, meaning-making, and personal growth. For gifted learners, whose socio-emotional needs are often as distinctive as their cognitive abilities, the human dimensions of education remain essential.

The most promising models for artificial intelligence in gifted education envision AI augmenting rather than replacing human teachers. In this understanding, artificial intelligence assumes routine diagnostic and content delivery functions, freeing teachers to focus on the aspects of instruction that most require human judgment: facilitating deep discussions, providing emotional support, nurturing creativity, and connecting learning to broader questions of meaning and purpose. This division of labor potentially creates a richer educational environment than either humans or artificial intelligence could create alone, but it requires intentional design and continuous calibration.

Implementation Challenges and Practical Considerations

The effective implementation of artificial intelligence-supported inclusive gifted education requires consideration of multidimensional implementation challenges beyond technical possibilities. Infrastructure and human resource competencies, teacher preparation, compatibility with existing education systems, financial sustainability, and institutional change management are among the fundamental elements determining the success of this transformation. This section aims to reveal the practical limitations shaping the field-level correspondence of artificial intelligence-based applications and the critical assessment areas that need to be addressed at the policy level.

Infrastructure and Resource Requirements

Successful implementation of artificial intelligence-supported inclusive gifted education requires significant

infrastructure investment. Reliable high-speed internet connectivity, adequate computing devices for students, and robust data management systems constitute the technical foundation upon which sophisticated educational applications depend. In many contexts, particularly in rural and economically disadvantaged communities, these infrastructure requirements pose significant barriers to equitable access. Policy frameworks must therefore address not only the educational applications of artificial intelligence but also the foundational infrastructure that enables these applications.

Beyond physical infrastructure, effective implementation requires human resource development. Teachers need both technical competencies to operate and troubleshoot AI systems and pedagogical understanding to meaningfully integrate these tools into instruction. School administrators require knowledge to make informed decisions about system selection, implementation, and evaluation. Technology support personnel must be prepared to maintain systems and respond to technical issues. Building this human capacity requires sustained investment in professional development and may necessitate new staffing models and organizational structures.

Teacher Preparation and Professional Development

The role of teachers in artificial intelligence-supported educational environments differs significantly from traditional instructional roles. Rather than serving as primary content deliverers, teachers increasingly function as learning designers, data interpreters, relationship managers, and human sources of the mentorship and

inspiration that artificial intelligence cannot provide. This role transformation requires rethinking both initial teacher preparation and ongoing professional development. Pre-service teacher education programs must include exposure to AI tools and critical evaluation of their pedagogical implications; in-service professional development must help practicing teachers adapt to new expectations and capabilities.

For teachers working specifically with gifted learners, professional development must address the intersection of advanced learner needs and technological capabilities. Teachers need to understand both the characteristics and needs of gifted students and how AI tools can support differentiation for these learners. Equally important is understanding the limitations of AI systems and the continuing importance of human judgment, creativity, and relationship in supporting gifted learners' socio-emotional as well as cognitive development.

Integration with Existing Education Systems

Artificial intelligence-supported education does not exist in isolation but must integrate with existing curricular frameworks, assessment systems, and institutional structures. This integration presents practical challenges that policy must address. How should AI-based assessments relate to traditional grading systems? How can adaptive acceleration be reconciled with grade-level expectations and standardized testing schedules? How should time spent with AI systems be balanced against other educational activities and social interactions? These questions do not have universal answers; they require context-specific solutions developed through

collaboration among policymakers, educators, families, and students.

For gifted education specifically, integration challenges include the articulation between AI-based acceleration and traditional course sequences, recognition of AI-supported learning for academic credit, and coordination between regular classroom instruction and specialized gifted programs. In contexts such as Türkiye, where gifted students attend BİLSEM centers alongside their regular schooling, additional questions arise about how AI tools used in one setting relate to instruction in the other and how data and insights might be appropriately shared across contexts.

Financial sustainability represents another critical implementation consideration. While initial costs of AI system acquisition can be significant, ongoing costs for licensing, maintenance, updates, and support often exceed initial investments over time. Moreover, the rapid pace of technological change means that systems may require replacement or significant upgrading within relatively short timeframes. Policy frameworks should encourage cost-benefit analysis that considers total cost of ownership rather than focusing solely on acquisition costs, and should explore models such as consortium purchasing that may reduce costs for individual institutions.

Change management and institutional readiness are also factors that must not be overlooked. Successful integration of artificial intelligence technologies depends not only on technical infrastructure and individual competencies but also on institutional culture and leadership vision. School administrators need to develop

a clear vision for technology integration, engage stakeholders in this vision, and develop strategies for coping with resistance that may arise during the implementation process. The change management literature demonstrates that successful technology integration often depends on human and organizational factors rather than technical factors.

Future Perspectives and Policy Recommendations

Artificial intelligence-supported inclusive gifted education requires not only the improvement of current applications but also making strategic choices regarding how education systems will be structured in the future. While emerging technologies offer new possibilities for deepening learning experiences and supporting individual potential, the realization of these possibilities in ways aligned with principles of equity, ethics, and sustainability depends on effective policy frameworks. This section addresses the technological trends expected to emerge in the near future and the educational implications they carry for inclusive gifted education; it also aims to provide guiding recommendations for policymakers.

Emerging Technologies and Their Educational Implications

Several technological developments in the near future hold significant implications for inclusive gifted education. Large language models, exemplified by systems such as GPT-4 and their successors, offer increasingly sophisticated capabilities for generating educational content, providing feedback on student work, and engaging in pedagogical dialogue. These systems can

produce explanations at various levels of complexity, generate original practice problems, and adapt communication styles to individual learners; they can potentially serve as tireless intellectual companions for gifted students whose need for challenge and discussion exceeds what their immediate environment can provide.

Immersive technologies, including virtual and augmented reality, offer experiential learning possibilities that transcend the physical limitations of classroom settings. Gifted students can conduct virtual chemistry experiments with dangerous substances, explore historical sites at moments when significant events occurred, or manipulate mathematical objects in three-dimensional space. Early research on virtual and augmented reality in educational settings has revealed particularly promising results for engaging students who struggle with traditional instruction; however, the evidence base for applications specifically with gifted learners remains limited.

Multimodal artificial intelligence systems that integrate text, image, audio, and video processing are opening possibilities for richer assessment and feedback. Such systems can evaluate complex project work, analyze student presentations for both content and delivery, and provide nuanced feedback that addresses multiple dimensions of performance. For gifted learners who may be able to express their understandings through creative products rather than traditional assessments, multimodal AI may enable more authentic assessment of achievement and development. These systems also carry potential for increasing inclusivity by providing alternative assessment

pathways for twice-exceptional students with learning difficulties.

Artificial intelligence agents and autonomous learning systems are among the technologies expected to play an even more significant role in the future. These systems may allow students to take a more active role in setting learning goals, exploring resources, and monitoring progress. Particularly for gifted students, whose self-regulated learning skills are generally well-developed, such systems can be powerful tools for independent research and exploration. However, this autonomy must be balanced with teacher oversight and guidance, and mechanisms must be developed to ensure that students remain on constructive learning paths.

Policy Recommendations for Inclusive AI-Supported Gifted Education

Based on the analysis presented in this chapter, several policy recommendations emerge for jurisdictions seeking to develop effective frameworks for artificial intelligence-supported inclusive gifted education. First, policies should establish clear principles for the ethical use of artificial intelligence in education, addressing data privacy, algorithmic transparency, human oversight, and equity in access and outcomes. These principles should be developed through inclusive processes that incorporate the perspectives of educators, families, students, technical experts, and civil society organizations.

Second, significant investment in professional development is needed to prepare educators for effective integration into artificial intelligence tool applications. Teachers need not become AI experts, but they require

sufficient understanding to select appropriate tools, critically interpret system outputs, and maintain meaningful human relationships with learners even as technology plays an increasing role.

Third, policies should promote interoperability and standards that prevent lock-in to proprietary systems while enabling innovation. Educational institutions should retain control over student data and be able to transition between systems without losing valuable historical information. Open standards for learning analytics and adaptive learning will support both competition among providers and research that advances the field as a whole.

Fourth, research investment should support rigorous evaluation of AI applications in gifted education, with attention to both intended outcomes and potential unintended consequences. Particularly important is researching the equity implications of whether AI tools reduce or exacerbate disparities in identification and educational opportunity across demographic groups.

Fifth, policy frameworks should be designed to be adaptive, for the rapid tempo of technological change means that specific technical provisions may quickly become outdated. Establishing principles, governance structures, and review mechanisms may be more durable than detailed technical requirements. Regular review cycles can ensure that policies remain aligned with current technological capabilities and emerging research evidence. Additionally, policymakers should be open to learning from international experiences and benefit from comparative policy analysis.

Sixth, policies should encourage multi-stakeholder participation. The success of artificial intelligence-supported education depends not only on technological factors but also on stakeholder acceptance and participation. Teachers, families, students, and community members should be included in policy development processes, and the appropriateness of artificial intelligence applications to local needs and values should be ensured. This participatory approach both increases the legitimacy of policies and supports implementation success.

Finally, policies should also consider global competition and national development goals. The development of gifted individuals holds strategic importance for strengthening countries' science, technology, and innovation capacities. Using artificial intelligence technologies in ways that help these individuals realize their potential can provide both individual and societal benefits. However, realizing this potential requires long-term vision, continuous investment, and strategic policy coordination.

Conclusion

The integration of artificial intelligence and digital technologies into inclusive gifted education constitutes both an opportunity and a challenge for education policy. The opportunity lies in the unprecedented potential for personalized, adaptive instruction capable of meeting individual learner needs at scale. The challenge is ensuring that this potential is realized in ways that are equitable, ethical, and preserve the essentially human character of education.

As this chapter has demonstrated, jurisdictions worldwide are actively developing policy frameworks to navigate this terrain. While approaches vary according to local contexts, priorities, and educational traditions, common themes emerge: the importance of ethical guidance, the need for teacher professional development, attention to equity and access, and recognition that artificial intelligence should augment rather than replace human educators. These themes provide a foundation for continued policy development as technologies evolve and research evidence accumulates.

In the Türkiye context, the BİLSEM system offers a unique platform for testing and implementing artificial intelligence-supported educational innovations. The openness of teachers in these centers to technology, the tradition of project-based learning, and the characteristic curiosity and passion for learning of gifted students create fertile ground for AI integration. The Ministry of National Education's 2025-2029 AI Policy Document in Education and Action Plan provides a comprehensive framework to guide efforts in this area. However, successful policy implementation requires infrastructure investment, teacher professional development, and continuous research evaluation.

Particularly for gifted learners, artificial intelligence-supported education offers the possibility of learning experiences calibrated to their advanced abilities, rapid learning tempos, and passionate interests in inclusive environments that also benefit their diverse peers. Realizing this possibility requires intentional effort to develop technologies that recognize diverse forms of giftedness, design policies that ensure equitable access

and outcomes, and prepare educators to use new tools while continuing to focus on the relational and developmental dimensions of their work.

The future of inclusive gifted education will be shaped by policy decisions made in the coming years. By approaching the integration of artificial intelligence with attention to both its possibilities and its perils, by centering equity and human development in policy frameworks, and by maintaining commitment to evidence-based practice, education systems can harness the power of emerging technologies in service of their most fundamental mission: supporting each learner in developing their unique potential. The stakes are high: exceptional learners who receive appropriately challenging education can make extraordinary contributions to human knowledge and welfare, while those whose potential remains unrealized represent a loss not only for themselves but for society as a whole.

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CHAPTER 7

INTEGRATION STRATEGIES FOR GIFTED STUDENTS WITHIN THE FRAMEWORK OF INCLUSIVE EDUCATION PRACTICES

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Introduction

Definition of Giftedness and Inclusion

Giftedness is a multifaceted construct extending beyond high IQ scores. Contemporary frameworks define it as an interaction among above-average abilities, creativity, motivation, and contextual influences that foster talent development (Renzulli, 1978; Gagné, 2013). Gifted individuals may excel in science, language, the arts, leadership, or problem-solving (Santos & Natividad, 2023). Yet definitions vary across cultures and education systems, and there is no global consensus on how giftedness should be identified or nurtured (Rutigliano & Quarshie, 2021).

Inclusion, meanwhile, refers to systemic efforts ensuring that every learner—regardless of ability, background, or socio-emotional profile—has equitable access to quality education (Marsili et al., 2023). Historically, it has focused on learners with disabilities or social disadvantages, but scholars increasingly contend that inclusion must also embrace those with advanced abilities to prevent marginalization (Lo et al., 2021; Prior, 2022).

The Place of Gifted Students in Inclusive Education

Inclusive education was originally designed to eliminate barriers for learners facing disabilities or socio-economic and linguistic challenges. However, the same principles apply to gifted learners, whose advanced abilities can paradoxically lead to disengagement or isolation when left unsupported (Reis & Renzulli, 2010; Pfeiffer, 2012). Gifted students form a heterogeneous group with varied profiles of high intellectual capacity, creativity, or

leadership (Tomlinson, 2017; Phelps et al., 2023). Nevertheless, their needs are often sidelined in reform agendas that prioritize struggling learners (Marsili et al., 2023).

International policy frameworks increasingly call for a broader interpretation of inclusion. The Salamanca Statement (UNESCO, 1994) and UNESCO's Global Education Monitoring Report (2020) emphasize that true equity values every learner's diversity, including those with advanced learning needs. Within this vision, gifted education represents not elitism but fairness, ensuring all students have opportunities for enriched and accelerated learning consistent with the principles of participation and belonging (Lasekan et al., 2025).

Why Integration Matters for Teachers and Schools

Integrating gifted learners into inclusive classrooms enhances both fairness and educational quality. When their needs go unrecognized, students may experience boredom, frustration, or social difficulties stemming from asynchronous development (Ünlü & Karadaş, 2023). Conversely, when teachers apply differentiation, enrichment, and socio-emotional support, gifted students thrive and contribute to richer learning environments for all (Fodor, 2025).

Teachers are central to this integration. Differentiated instruction, cluster grouping, and Universal Design for Learning (UDL) enable them to challenge advanced learners while supporting diverse peers (Almazán-Anaya, 2023; Mankgele, 2024). However, many educators report feeling underprepared. Professional development focused on gifted education and emerging competencies such as

Gifted Technological Pedagogical Content Knowledge (GTPACK) can build teachers' confidence in designing flexible, technology-supported learning (Ayık & Gül, 2025).

At the institutional level, embedding gifted education within Multi-Tiered Systems of Support (MTSS) creates coherent structures addressing both advanced and struggling learners (Smith, 2025). Inclusive gifted practices also align with the UN Sustainable Development Goals, which promote equality and excellence across education systems (United Nations, 2015). Cultivating gifted students' potential thus contributes not only to personal fulfilment but also to societal innovation and progress.

Key Challenges Encountered in Practice

Inclusive gifted education still faces systemic hurdles. Identification remains problematic: heavy reliance on IQ-based screening can overlook culturally and linguistically diverse learners and mask potential among disadvantaged students (Rutigliano & Quarshie, 2021; Phelps et al., 2023). Twice-exceptional students—those with high ability plus learning or emotional difficulties—are especially vulnerable to misdiagnosis and under-support due to complex profiles (Van Hooijdonk et al., 2025).

Teacher preparedness is another barrier. Many educators report limited training for recognizing and responding to gifted learners, making it difficult to balance enrichment for advanced students with remediation for those who struggle; as a result, differentiation often tilts toward remediation rather than opportunities for high-level challenge (Ayık & Gül, 2025; Prior, 2022).

Institutional constraints compound these issues. Restricted funding, high student–teacher ratios, and scarce specialist personnel limit access to enrichment, mentoring, and acceleration—particularly in rural and under-resourced schools—thereby widening inequities between well-resourced and less-resourced settings (Mankgele, 2024). These disparities deepen existing inequalities, as students in better-funded settings are far more likely to receive appropriate support.

Finally, conceptual and attitudinal barriers persist. Some policymakers and educators continue to frame gifted education as at odds with inclusion, reinforcing a false divide between equity and excellence (Marsili et al., 2023). Reframing gifted education as a core equity commitment positions appropriate challenge for advanced learners as integral to inclusive schooling, ensuring that every student has access to meaningful stretch and opportunities to flourish.

Consequently, integrating gifted students into inclusive education is both a moral and practical necessity. It recognizes their rightful place within the spectrum of diversity and underscores the importance of teacher competence, systemic design, and equitable policy. Models such as UDL and MTSS, coupled with sustained professional learning, offer pathways to bridge policy and practice so that gifted learners are not overlooked but embraced as vital contributors to inclusive school communities.

From Conceptual Foundations to Classroom Practices

The translation of theories of giftedness into classroom practices is central to making inclusive education

effective for advanced learners. Models such as Renzulli's Three-Ring Conception, Gagné's Differentiated Model of Giftedness and Talent (DMGT), and Gardner's Multiple Intelligences provide useful frameworks for designing responsive teaching strategies that align with the diverse needs of gifted students. Applying these theories in inclusive classrooms requires attention to both equity and differentiation, ensuring that gifted students thrive alongside their peers.

Classroom Implications of Giftedness Theories

Renzulli (1978, 2005) conceptualized giftedness as the interaction of above-average ability, creativity, and task commitment. This "three-ring" model suggests that classrooms should provide opportunities for independent projects, creative problem-solving, and sustained inquiry. Practical applications include enrichment clusters and project-based learning tasks, where students choose real-world problems to investigate (Renzulli & Reis, 2014).

Gagné's DMGT distinguishes between natural abilities (gifts) and systematically developed competencies (talents), emphasizing the role of intrapersonal and environmental catalysts in talent development (Gagné, 2013; Lasekan et al., 2025). Classroom practices informed by DMGT highlight early identification, mentoring, and structured opportunities that transform raw potential into expertise. Teachers can facilitate this by offering tiered assignments, mentorship programs, and flexible pacing.

Gardner's (1983, 2011) theory of Multiple Intelligences expands the view of giftedness by recognizing linguistic, logical-mathematical, spatial, bodily-kinesthetic,

musical, interpersonal, intrapersonal, and naturalistic intelligences. In inclusive classrooms, this translates into designing tasks that allow multiple entry points and diverse modes of expression. For example, a science concept may be explored through experiments, diagrams, songs, or debates, enabling gifted students to demonstrate strength in varied modes (Armstrong, 2018).

Principles of Inclusive Education and Classroom Applications

Inclusive education emphasizes equity, participation, and respect for learner diversity (Ainscow, 2020; Prior, 2022). While much inclusive discourse historically focused on disability, there is growing recognition that gifted students are equally part of this diversity (Lo et al., 2021). The principle of 'education for all' requires that gifted learners are not left underserved within general classrooms.

Research indicates that when teachers differentiate, they often focus primarily on struggling learners, inadvertently neglecting gifted students (Taylor, 2016; Walsh & Jolly, 2018). To counter this, inclusive pedagogy must embed differentiation in ways that simultaneously scaffold weaker students and extend stronger ones. Strategies include open-ended questioning, curriculum compacting, and flexible grouping, all of which allow gifted students to work at appropriate levels of challenge (Tomlinson, 2017).

Aligning Inclusive Principles with Learning Characteristics of Gifted Students

Gifted learners often exhibit rapid learning, advanced problem-solving, intense curiosity, and heightened sensitivity (Marsili et al., 2025). Aligning inclusive principles with these characteristics requires balancing acceleration with social-emotional support. For example, while a student may master curriculum content quickly, they may also experience asynchronous development that creates frustration or social difficulties (Ünlü & Karadaş, 2023).

Classrooms that value voice and choice help align inclusive ideals with gifted students' learning profiles. Encouraging students to select research topics, set personal goals, and co-design assessments enhances both engagement and self-regulation (Fodor, 2025). Moreover, providing safe environments that validate sensitivity and perfectionism supports students' well-being while maintaining academic challenge.

Practical Adaptations for Twice-Exceptional Learners

Twice-exceptional (2e) students—those who are both gifted and have disabilities—pose unique challenges in inclusive classrooms. They often demonstrate advanced reasoning but struggle with organization, attention, or literacy (Reis et al., 2014). Teachers may misinterpret their inconsistent performance, leading to under-identification (Van Hooijdonk et al., 2025).

Practical adaptations for 2e learners in inclusive classrooms may include:

- Individualized learning plans that integrate enrichment with accommodations.
- Flexible assessment formats, such as oral presentations or multimedia projects, allowing students to demonstrate strengths while minimizing disability-related barriers.
- Collaborative planning among teachers, counsellors, and parents to ensure consistent support.
- Technology tools, such as speech-to-text software or AR-enhanced tasks, which support both learning differences and advanced exploration.

Furthermore, systemic frameworks like MTSS can provide tiered interventions that address both advanced learning needs and disabilities within one coherent structure (Smith, 2025).

In summary, transforming theories of giftedness into inclusive classroom practices requires moving beyond definition to daily pedagogy. The frameworks of Renzulli, Gagné, and Gardner offer insights into how learning experiences can be structured to foster creativity, transform potential into talent, and honour multiple intelligences. Inclusive principles—equality, participation, respect for diversity—must be explicitly aligned with the learning characteristics of gifted students to prevent disengagement or failure. Practical adaptations, especially for twice-exceptional learners, ensure that gifted education is not isolated from the broader inclusive education movement but rather embedded within it. Ultimately, creating classrooms that

challenge, support, and celebrate diverse forms of giftedness reflect both good pedagogy and the spirit of inclusive education.

Identifying and Understanding Gifted Learners

Early Signs and Observable Indicators in the Classroom

Recognizing giftedness begins with teachers' awareness of early signs that may appear during everyday learning. Gifted students often demonstrate advanced vocabulary, rapid learning, unusual curiosity, and the ability to grasp abstract concepts earlier than peers (Phelps et al., 2023). They may display intense focus on particular topics, heightened creativity, or the ability to make connections across disciplines (Marsili et al., 2023). In some cases, gifted learners also show asynchronous development, excelling academically while experiencing challenges in emotional or social maturity (Ünlü & Karadaş, 2023).

Teachers are uniquely positioned to identify these early indicators, as they observe daily interactions, problem-solving approaches, and social behaviours. Classroom signs may include persistent questioning, preference for complex tasks, or frustration with repetitive activities (Lo et al., 2021). Recognizing such behaviours as potential markers of giftedness, rather than misinterpreting them as boredom or misbehaviour, is critical for equitable identification.

Teacher Checklists and Observation Strategies

Systematic observation tools support teachers in distinguishing gifted characteristics from typical classroom performance. Checklists focusing on creativity, motivation, leadership, and advanced

cognitive skills can help document student behaviours over time (García-Martínez et al., 2021). For example, teachers might record evidence of problem-solving flexibility, originality in written or oral tasks, or leadership during group activities.

Observation should be structured and continuous rather than based on isolated impressions. Strategies such as anecdotal records, rating scales, and peer comparisons allow teachers to track consistent patterns of advanced ability. Digital portfolios can also capture student work that demonstrates depth of understanding and creativity. Importantly, observation strategies must account for cultural and linguistic diversity; otherwise, teachers risk overlooking talents in students whose giftedness manifests in non-traditional ways (Ford, 2013).

The checklist below is designed to support teachers in systematically observing potential signs of giftedness in the classroom. It can be adapted to different grade levels and cultural contexts. Teachers should look for recurring patterns over time rather than isolated behaviours.

Table 1. Teacher Checklist for Identifying Gifted Learners

Usage guidance:

- Review checklist items weekly or monthly.
- Collect examples of student work, participation, or interactions.
- Combine with formal assessments and parent input for a holistic view.
- Use patterns, not single observations, to inform referrals or enrichment decisions.

Domain	Observable Indicators	Teacher Notes / Examples
Cognitive / Academic	Grasps new concepts rapidly; advanced vocabulary; demonstrates abstract thinking beyond grade level.	
Creativity	Produces original ideas; enjoys imaginative play; connects unrelated concepts; demonstrates flexible problem-solving.	

- Review checklist items weekly or monthly.
- Collect examples of student work, participation, or interactions.
- Combine with formal assessments and parent input for a holistic view.
- Use patterns, not single observations, to inform referrals or enrichment decisions.

Domain	Observable Indicators	Teacher Notes / Examples
Motivation / Task Commitment	Shows persistence with challenging tasks; sets personal goals; demonstrates deep curiosity and intense focus on areas of interest.	
Social & Leadership	Takes initiative in group work; influences peers positively; assumes leadership roles; mediates conflicts effectively.	
Communication	Expresses ideas fluently; uses advanced reasoning in discussions; may	

- Review checklist items weekly or monthly.
- Collect examples of student work, participation, or interactions.
- Combine with formal assessments and parent input for a holistic view.
- Use patterns, not single observations, to inform referrals or enrichment decisions.

Domain	Observable Indicators	Teacher Notes / Examples
	prefer interaction with older peers or adults.	
Emotional / Behavioural	Displays heightened sensitivity to fairness or justice; shows empathy; may express frustration with routine or repetitive work.	
Learning Preferences	Prefers independent study; enjoys self-directed projects; demonstrates strong interest in specialized topics.	

- Review checklist items weekly or monthly.
- Collect examples of student work, participation, or interactions.
- Combine with formal assessments and parent input for a holistic view.
- Use patterns, not single observations, to inform referrals or enrichment decisions.

Domain		Observable Indicators	Teacher Notes / Examples
Potential Indicators	2e	Strong abilities coexisting with difficulties in handwriting, organization, attention, or social-emotional regulation.	

Combining Formal Tests with Informal Assessments

Teacher observations are very important, but they yield the most effective results when combined with multiple identification criteria. Standardized tests, such as IQ assessments or achievement tests, provide data on cognitive abilities and academic performance, but these tools alone cannot reveal all the characteristics of gifted students (Rutigliano & Quarshie, 2021). Formal tests often favour students with privileged backgrounds and

create inequalities in access to gifted programs (Phelps et al., 2023).

Informal assessments, including dynamic assessment, portfolios, and performance-based tasks, complement formal testing by providing a more holistic picture (Gagné, 2013). For instance, project-based learning outcomes can reveal higher-order thinking, creativity, and leadership that standardized measures might miss (Almazán-Anaya, 2023). Combining data sources not only improves accuracy but also ensures that underrepresented groups—such as 2e learners or students from minority backgrounds—are identified more fairly (Smith, 2025).

Best practice emphasizes a multi-criteria approach, where test results, classroom observations, teacher checklists, and student work samples are triangulated to inform decisions (National Association for Gifted Children [NAGC], 2025). This approach aligns with inclusive education principles by reducing reliance on any single indicator and broadening access to enrichment opportunities.

Teacher–Parent Collaboration in Identification

Parents are often the first to notice advanced behaviours in their children, such as early language acquisition or unusual memory capacity. Teacher–parent collaboration is therefore essential in building a comprehensive understanding of the learner (Van Hooijdonk et al., 2025). Parents can provide insights into students' interests, behaviors at home, and developmental history, while teachers contribute professional observation within structured learning environments.

Effective collaboration requires open communication and mutual trust. Schools can facilitate this through regular conferences, shared checklists, and collaborative goal setting for enrichment or intervention. Involving parents in the identification process also increases cultural sensitivity, as families bring unique perspectives on giftedness shaped by cultural and community values (Sternberg, 1999).

Collaboration is especially critical for 2e learners. Parents may observe their child's advanced abilities alongside difficulties, while teachers may primarily notice the challenges. Together, their perspectives can prevent misdiagnosis and ensure that both strengths and needs are addressed (Reis et. al, 2014).

Briefly, identifying gifted students is not a one-time event but an ongoing, collaborative process that integrates classroom observations, structured checklists, formal assessments, and parental input. Teachers play a central role in noticing early signs, while structured observation strategies and multiple measures ensure more equitable identification. Strong partnerships between teachers and parents enhance accuracy and cultural responsiveness, particularly for students whose giftedness may be masked by language, disability, or socio-emotional challenges. By adopting such inclusive and practice-oriented approaches, schools can more effectively "know the learner" and provide educational experiences that nurture their full potential.

Instructional Strategies in the Inclusive Classroom

Inclusive classrooms that serve gifted learners must employ instructional strategies that extend beyond grade-

level expectations. Standardized curricula alone often fail to provide adequate challenge, which may lead to disengagement or underachievement. To meet their advanced needs within an inclusive framework, teachers can implement curriculum enrichment, acceleration and compacting, project-based learning, and digital platforms to support meaningful learning opportunities.

Curriculum Enrichment

Joseph Renzulli's enrichment triad model is the basis for enrichment strategies. It focusses on Type I (general discovery), Type II (group instruction), and Type III (individual investigation of real-world problems) learning activities (Renzulli, 2005). In inclusive classrooms, enrichment activities might be independent research projects, mentoring programs, or advanced reading materials that are based on what the students are interested in. These methods help students learn more deeply instead of just speeding up the process. This boosts their motivation and helps them develop their creativity and problem-solving skills (Phelps et al., 2023). For instance, teachers can add chances for students to design experiments or look at real data sets to the science curriculum. This kind of enrichment lets both gifted and non-gifted students learn more about the material while still being open to everyone (VanTassel-Baska & Little, 2017).

Acceleration and Curriculum Compacting

Acceleration, including grade skipping, subject acceleration, or early access to advanced courses, is one of the most well-researched ways to help gifted students (Colangelo et al., 2004). In an inclusive classroom,

though, curriculum intensification, which makes things easier for students who have already learnt them, is a useful way to go. This approach cuts down on repetition and gives students time to work on more advanced or interest-based projects (Reis & Renzulli, 1992). For instance, if a student shows that they know how to do algebra on pre-tests, the teacher can let them skip the regular drills and instead give them exploratory tasks in more advanced math topics. Acceleration lets gifted students stay socially with their peers while learning at a pace that works for them (NAGC, 2025).

Project-Based and Inquiry-Based Learning

Inquiry and project-based learning (PBL) are very good for gifted students because they do best when they have freedom and chances to solve real problems. Renzulli and Reis (2014) stressed that finding and solving real-world problems is an important part of developing talent. PBL encourages students to do long-term research that brings together different subjects and encourages them to work together (Almazán-Anaya, 2023). For instance, in a unit on social studies, students might look into problems in their own community, come up with solutions, and then tell civic leaders what they found. This process improves higher-order thinking, creativity, and communication, and it also encourages peer learning in settings that are open to everyone. Research indicates that inquiry-based methodologies enhance motivation and engagement, benefiting both gifted students and the wider classroom community (Hmelo-Silver, 2004).

Online Resources and Digital Platforms

In inclusive classrooms, technology gives teachers powerful ways to help each student learn in their own way. Digital platforms let people learn at their own pace, access more advanced content, and work together with people from all over the world. Gifted students can use online databases, virtual labs, or university resources that are open to everyone to learn about things that aren't in the school curriculum. In STEM education, augmented reality (AR) and simulation tools help make abstract ideas more concrete (Ayık & Gül, 2025). For instance, an AR-enhanced science lesson lets students see molecular structures, which helps both gifted students and their classmates. Gifted students can show off their work and get feedback from people all over the world through online forums, blogs, and digital portfolios (Chen et al., 2013).

Consequently, pedagogical approaches for gifted students in inclusive classrooms must amalgamate enrichment, acceleration, inquiry, and the integration of technology. Renzulli's enrichment framework and curriculum compacting give teachers ways to make sure that the material is appropriate for each student based on their readiness and interests. Project-based and inquiry learning encourage independence, creativity, and real-world involvement. Digital platforms, on the other hand, make it easier to get to advanced resources and new ways of learning. These strategies not only meet the academic and social-emotional needs of gifted students, but they also make education more inclusive by giving all students better learning opportunities.

Social and Emotional Support Practices

Gifted learners often experience unique social-emotional challenges that require intentional classroom support. While their cognitive abilities may set them apart, they are still children and adolescents navigating the same developmental tasks as their peers. In inclusive classrooms, teachers play a critical role in addressing issues such as loneliness, adjustment difficulties, and the need for belonging. Effective strategies include structured group work, classroom activities that promote connection, and teacher approaches that validate emotional as well as intellectual needs.

Group Work to Strengthen Peer Relationships

Collaborative learning promotes academic growth and social integration. Gifted learners benefit from cooperative problem-solving over competition (Marsili, Dell'Anna, & Pellegrini, 2025). In Renzulli's Schoolwide Enrichment Model, mixed-ability enrichment clusters tackle real-world projects, advancing talent development and peer interaction (Renzulli & Reis, 2014). Thoughtful group design reduces isolation by positioning gifted students as contributors—for example, a gifted student leads design while peers handle implementation, creating interdependence and respect.

Addressing Loneliness and Adjustment Issues

Despite high ability, gifted students can experience loneliness due to asynchronous development and heightened sensitivity (Ünlü & Karadaş, 2023). Targeted supports—peer mentoring, lunch clubs, and affinity groups—offer shared spaces and reduce isolation (Cross

& Coleman, 2014). Teachers should normalize diverse learning profiles so classmates value intellectual differences as part of classroom diversity.

Classroom Activities to Foster a Sense of Belonging

Belonging predicts well-being and engagement. Brief rituals (morning meetings, appreciation circles, reflective journaling) give gifted learners voice, while PERMA-aligned practices build resilience and connection (Fodor, 2025). Culturally responsive approaches and shared-purpose tasks (e.g., service-learning, collaborative problem-solving) help gifted students from diverse backgrounds feel represented and integral to the community (Eun, 2016).

Teacher Approaches to Support Emotional Needs

Teachers are central to creating emotionally supportive classrooms. Gifted learners often seek meaningful relationships with adults who understand both their cognitive and affective needs (Lo et al., 2021). Teacher practices that validate student voice, encourage self-regulation, and respond empathetically to perfectionism or stress are particularly beneficial (Prior, 2022). In practice, this might include providing flexible deadlines for students struggling with perfectionism, or offering reflective discussions about managing expectations. Teachers also need professional development to understand the dual realities of giftedness: high ability paired with vulnerability (Phelps et al., 2023).

Twice-exceptional students illustrate this complexity vividly. While they may excel in reasoning or creativity, disabilities such as ADHD or dyslexia can compound

emotional struggles. Research shows that collaboration between educators, parents, and specialists is essential to meet the needs of these learners holistically (Van Hooijdonk et al., 2025). Teachers who adopt a strength-based lens—emphasizing capabilities while providing accommodations—can help 2e learners build confidence and resilience.

In summary, supporting the social-emotional needs of gifted learners requires strategies that extend beyond academic enrichment. Group work strengthens collaboration and peer bonds, while goal-oriented programs address loneliness and adjustment issues. Classroom rituals and inclusive activities foster a sense of belonging, while approaches focused on empathy, flexibility, and strengths support emotional well-being. As Renzulli's work underscores, nurturing talent cannot be separated from nurturing the whole child (Renzulli, 2005). By embedding social and emotional supports into inclusive classrooms, schools not only enhance gifted students' academic outcomes but also contribute to their overall flourishing.

Collaborative Models and School-Based Practices

Inclusive education for gifted learners requires collaborative models that bring together teachers, parents, specialists, and peers. Schools that adopt team-based approaches ensure that gifted students' advanced needs are met within the broader framework of inclusive classrooms. Such collaboration is not only a logistical necessity but also a philosophical commitment to shared responsibility for student success.

Team Teaching and Interdisciplinary Collaboration

Team teaching and interdisciplinary approaches enable schools to bring together expertise from different subject areas. In inclusive classrooms, this allows gifted students to experience curriculum connections and advanced research opportunities. Renzulli's School-Wide Enrichment Model emphasizes enrichment clusters that typically draw on multiple disciplines, bringing together teachers from science, humanities, and arts to create unique projects (Renzulli & Reis, 2014). For example, a cluster on "sustainable cities" might include science teachers for environmental systems, social studies teachers for policy, and art teachers for design. This type of collaboration mirrors real-world problem solving and provides meaningful extensions for advanced students.

Research suggests that team teaching enhances differentiation because teachers can divide roles, with one guiding the core content and the other extending challenges for students ready for more depth (Phelps et al., 2023). This collaborative approach also reduces the isolation of gifted education, embedding enrichment within whole-school practice rather than limiting it to pull-out programs (Friend, 2016).

Strategies to Enhance Parental Involvement

Parents play a vital role in supporting the learning processes of gifted students, and schools that actively involve families in the process generally report stronger academic and social-emotional outcomes. Inclusive practices utilize structured communication such as regular parent-teacher meetings, digital portfolios, and family workshops (Ünlü & Karadaş, 2023). Parents can

provide information about students' interests, sensitivities, and extracurricular learning experiences, and this information can contribute to personalized classroom activities.

Policies across OECD countries highlight parental collaboration as an essential dimension of inclusive gifted education (Rutigliano & Quarshie, 2021). Schools can also establish parent advisory councils for gifted education, allowing families to contribute ideas and advocate for resources. Furthermore, home-school projects such as family interviews for history or joint scientific experiments strengthen cooperation between schools and families by bridging formal and informal learning environments (Horn, 2015).

Integrating Counselors and Specialists into Classroom Practices

Gifted education is not solely the responsibility of classroom teachers. Counselors, school psychologists, and specialists provide essential expertise in supporting both cognitive and socio-emotional development. For 2e students, collaboration among professionals ensures that interventions address both advanced strengths and co-occurring learning difficulties (Van Hooijdonk et al., 2025).

Counselors can organize social skills groups, resilience workshops, and stress management programs tailored to the increasing sensitivities of gifted students (Fodor, 2025). Specialists such as enrichment coordinators or technology coaches can assist teachers in designing differentiated instruction using tools such as digital simulations or online research databases (Ayık & Gül,

2025). Importantly, research shows that schools that involve specialists in regular classroom practices, rather than relying solely on separate classes, create a more inclusive culture (Marsili et al., 2025).

Mentoring and Peer-Support Programs

Mentorship is an effective approach for developing the abilities of gifted students and offering social-emotional assistance. Renzulli's enrichment triad model emphasises Type III investigations, wherein students undertake independent projects with the mentorship of individuals from academia, industry, or community organisations (Renzulli, 2005). These mentorships help students link what they learn in class to real-life situations, which boosts their motivation and sense of self-efficacy.

Peer support programs are also very important for making places welcoming to everyone. Structured peer teaching or collaborative learning activities give gifted students chances to be leaders and learn from their peers at the same time (Smith, 2025). Such arrangements enhance the sense of belonging, mitigate social isolation, and promote the development of communication and collaboration skills among advanced students. Cross-age mentoring, where people of different ages work together, also builds supportive relationships that help both the mentors and the mentees (Kaufman & Sternberg, 2019).

Collaborative models and school-based practices are essential for the success of gifted learners in inclusive classrooms. Interdisciplinary and team teaching make learning fun and interesting. Strong partnerships between parents and teachers help students learn outside of school, and counsellors and specialists are important for meeting

students' emotional and cognitive needs. Mentoring and peer support programs help gifted students feel like they belong by giving them real-world experiences. Renzulli's frameworks remind us that developing talent needs everyone to work together in a system that includes all stakeholders. When schools do things like this, they not only help gifted students, but they also make the learning environment better for all students.

Professional Development for Teachers in Inclusive Gifted Education

Teachers are very important in making sure that gifted students get fair and useful help in inclusive classrooms. Despite exhibiting advanced potential, the needs of these students are often neglected due to persistent misconceptions and insufficient professional training. So, professional development (PD) in inclusive gifted education should have three main goals: improving teachers' skills, making it easier for them to keep learning, and encouraging reflection on their teaching that changes their beliefs and how they teach.
Key Skills for Working with Gifted Students

Teachers who work with gifted students need more than just general teaching skills. They must possess the ability to develop differentiated curricula, oversee classrooms with varying cognitive levels, and incorporate social-emotional learning into academic instruction (Marsili et al., 2025). Renzulli and Reis (2014) assert that educators ought to function as enablers of curiosity and creativity, rather than mere conveyors of content. Good teachers find out what their students are good at, give them extra work, and use acceleration or compacting strategies that keep them interested without being boring.

Addressing the needs of 2e learners—students with both advanced abilities and learning difficulties—requires diagnostic sensitivity and collaboration with counselors and specialists (Van Hooijdonk et al., 2025). Similarly, competencies in social-emotional learning (SEL) are vital, since gifted learners often struggle with perfectionism, overexcitability, or social adjustment (Ünlü & Karadaş, 2023). As Townend (2024) emphasize, academic and affective dimensions of learning are inseparable and must be addressed in tandem.

Workshops, In-Service Training, and Online Professional Resources

In-service workshops, summer institutes, and online training modules are crucial structured PD initiatives for developing these competencies. Practical sessions simulating differentiation, enrichment clusters, or curriculum compression enable teachers to apply new strategies in realistic contexts (Phelps et al., 2023). Long-term, iterative PD models create the most sustainable impact on teachers' practices, rather than one-off workshops (Rutigliano & Quarshie, 2021). Digital resources, webinars, and professional learning communities further expand access for teachers in geographically remote or resource-limited areas (Robinson et al., 2021). Furthermore, technology-focused innovations such as AR-integrated enrichment workshops (Ayık & Gül, 2025) demonstrate how PD can combine pedagogical advancement with digital fluency and enable teachers to personalize instruction using technology.

Ultimately, professional development for inclusive gifted education should integrate competency building, continuous access to learning, and reflective, evidence-

informed practice. Through such comprehensive models, teachers not only refine their instructional expertise but also contribute to an educational culture that values both excellence and inclusion.

Effective Practices and Case Studies

Documented case studies in gifted education provide valuable insights into how inclusive models can be effectively translated into classroom practice. Examining experiences from Turkey and abroad reveals diverse approaches, from school-wide enrichment to project-based lesson design, that demonstrate how gifted learners can thrive within inclusive environments.

Successful Classroom and School Models

In Turkey, inclusive gifted education has largely been supported through the Art and Science Centres (ASC) [Bilim ve Sanat Merkezi] framework, which supplements mainstream schooling with enrichment opportunities (Ünlü & Karadaş, 2023). While challenges remain in teacher preparation and differentiation, case reports suggest that ASC programs succeed in fostering advanced inquiry skills and creativity when teachers integrate individualized projects aligned with student interests. Similarly, inclusive classrooms that combine general education with talent-specific activities have been shown to promote belonging and prevent isolation (Sak, 2017).

Internationally, Renzulli and Reis's Schoolwide Enrichment Model (SEM) has been widely implemented as a framework that integrates gifted education principles into general schooling. Case studies from U.S. schools show that SEM increases student engagement,

encourages independent investigations, and supports both gifted and non-gifted learners by creating a culture of talent development (Renzulli & Reis, 2014). In the United Arab Emirates, a private British school successfully adopted differentiated enrichment and project-based approaches to integrate gifted learners, illustrating how international schools in multicultural contexts adapt inclusive models of gifted education (Chaya, 2021).

Sample Implementations with Project-Based Approaches

Project-based learning (PBL) recurs across successful implementations that both challenge and include gifted learners. In Mexico, a quasi-experimental doctoral study comparing full-time differentiated instruction, cluster grouping, and general education found that specialized, enrichment-oriented approaches were associated with stronger gains in gifted students' perceptual reasoning, underscoring the value of sustained, authentic projects (Almazán, 2023). In Türkiye, classroom designs that embed the engineering design process—such as robotics and 3D modeling—have strengthened gifted students' computational thinking, collaboration, and problem-solving while keeping teamwork central (Sen et al., 2021). Complementing these outcomes, a qualitative study using reflective journals with gifted learners documented how PBL promotes active participation, higher-order thinking, and purposeful technology use through cycles of inquiry, creation, iteration, and presentation (Girgin, 2020).

Similar patterns appear in robotics-focused PBL courses abroad. A content-analysis study in Taiwan reported that a semester-long, STEM-integrated robotics course

fostered deeper learning and positive attitudes toward STEM through team-based projects (Hsu & Tsai, 2022). Likewise, a semester-length implementation that integrated tangible robots into PBL found measurable improvements in students' computational-thinking performance (Hsieh et al., 2022). Taken together, these examples reflect a common teaching process: asking real questions, engaging in continuous research and iterative prototyping activities, and sharing products with real audiences. This process largely aligns with Type III research within the School-Wide Enrichment Model, where students act as first-hand researchers producing work for meaningful audiences (Renzulli & Reis, 2014). Across these settings, PBL enables advanced learners to assume leadership within mixed-ability groups while remaining integrated with age peers, supporting both talent development and classroom inclusion (Almazán, 2023; Girgin, 2020; Hsieh et al., 2022; Hsu & Tsai, 2022; Renzulli & Reis, 2014; Sen et al., 2021).

Lessons Learned from Effective Implementations

A common lesson from both Turkish and international case studies is that teacher professional development is a critical factor in implementation success. Teachers with training in differentiation and enrichment are better able to sustain project-based and inclusive models (Ayık & Gül, 2025). Without adequate preparation, enrichment activities risk becoming superficial add-ons rather than transformative practices.

Another lesson is how important it is to balance academic challenges with emotional and social support. Case studies consistently demonstrate that project-based learning not only cultivates higher-order thinking but also

fosters collaboration, peer appreciation, and an enhanced sense of belonging (Fodor, 2025; Marsili et al., 2025). Lastly, successful schools frequently implement whole-school strategies, embedding enrichment within the school culture instead of isolating it into separate programs. This systematic integration guarantees sustainability and equity, as demonstrated in SEM schools or state-level MTSS initiatives (Smith, 2025).

Case studies from Turkey and other countries show that schools can successfully implement inclusive gifted education when they use enrichment-oriented frameworks, teach teachers how to differentiate, and give students project-based chances to do real research. These examples show that inclusion is not just about giving people access; it's also about helping them feel like they belong and participate in a meaningful way. Educators can create welcoming spaces where gifted students can thrive alongside their peers by using tried-and-true methods like SEM, PBL, and school-based enrichment centres.

Conclusion and Future Directions

To make gifted education a part of inclusive school systems, we need both strong theoretical foundations and good classroom practices. The sections presented highlight several strategies, particularly those that are applicable: enrichment models, curriculum intensification, project-based and inquiry-based learning, and socio-emotional supports tailored to the unique needs of gifted and twice-exceptional learners. These practices align with Renzulli's three-ring model of giftedness, Gagné's Differentiated Giftedness and Talent Model, and Gardner's Multiple Intelligences Theory, all of which

stress that talent should be cultivated in nurturing environments rather than viewed as a fixed attribute (Renzulli, 2005; Gagné, 2013; Gardner, 2011).

Successful integration in the classroom relies on teachers' capacity to create adaptable learning pathways. When used in inclusive settings, enrichment and acceleration strategies offer both challenge and fairness (Reis & Renzulli, 1992; Phelps et al., 2023). Project-based learning enhances these opportunities by linking gifted students to genuine, interdisciplinary challenges, a methodology corroborated by international case studies (Almazán-Anaya, 2023; Ünlü & Karadaş, 2023). These examples demonstrate that inclusive gifted practices are not limited to elite contexts but can thrive in various cultural and policy frameworks.

Social and emotional support also remains integral. Gifted students often face adjustment difficulties, perfectionism, or feelings of isolation (Ünlü & Karadaş, 2023). Group work, peer mentoring, and teacher-led socio-emotional interventions are therefore not peripheral but essential. Embedding these supports into school culture ensures that inclusion goes beyond academic differentiation to encompass well-being and belonging (Fodor, 2025; Lo et al., 2021).

However, bridging the gap between policy and practice remains a central challenge. Many OECD countries emphasize gifted education in their strategic frameworks, but practical implementation varies widely (Rutigliano & Quarshie, 2021). Without systemic accountability, teacher training, and adequate resources, gifted learners may continue to be underserved even in systems that formally endorse inclusion (Smith, 2025). Professional

development is a particularly urgent area, as teacher misconceptions about giftedness—such as the assumption that gifted students "will succeed on their own"—remain prevalent (Marsili et al., 2025). Practice-based training, supported by workshops, online platforms, and schoolwide professional learning communities, is needed to sustain long-term change (Ayık & Gül, 2025; Townend, 2024).

Looking forward, future research must address several gaps. First, more longitudinal studies are needed to evaluate the long-term academic and socio-emotional outcomes of inclusive gifted education, especially in diverse cultural contexts. Second, there is a need to explore the intersectionality of giftedness with other dimensions of diversity such as disability, socioeconomic background, and cultural identity (Eun, 2016; Rutigliano & Quarshie, 2021). Third, digital tools and innovative technologies such as augmented reality, online collaboration, and adaptive learning systems should be further examined for their potential to personalize instruction and extend enrichment opportunities (Ayık & Gül, 2025; Chen et al., 2013).

In terms of applications, schools can adopt a roadmap that includes: (a) embedding enrichment and project-based learning into general classrooms; (b) providing ongoing PD for teachers; (c) ensuring collaboration among teachers, parents, and specialists; and (d) developing school cultures that prioritize equity and well-being alongside academic challenge. Such a roadmap reflects both international good practice and the growing consensus that gifted education is not an elitist add-on but a necessary component of inclusive schooling.

In conclusion, integrating gifted education into inclusive classrooms requires systemic alignment between policy and practice, sustained professional development for educators, and continuous research on culturally responsive and innovative strategies. By drawing on enrichment frameworks, project-based pedagogies, and collaborative models, schools can create environments where gifted learners not only achieve academically but also develop socially and emotionally. This vision aligns with the broader goal of inclusive education: ensuring that every learner, regardless of ability profile, is both challenged and supported to reach their full potential.

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CHAPTER 8

SUPPORTIVE EDUCATIONAL STRATEGIES FOR GIFTED STUDENTS WITHIN THE FRAMEWORK OF INCLUSIVE EDUCATION PRACTICES

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Introduction

The fundamental elements of a program include objectives, content, the teaching-learning process, and assessment and evaluation. However, the ways in which these elements are organized and the emphasis placed on them lead to the emergence of different program models (Ertürk, 1984). Considering the characteristics, individual differences, and needs of gifted individuals, the reason for the emergence of different program theories and models in the literature (Gürlen, 2021) is the need to organize these elements differently. A similar need is to determine support education strategies for gifted individuals within the framework of inclusive education practices. Because inclusive education is, first and foremost, a fair and flexible educational approach that supports the development of individuals with different levels of ability and promotes diversity in the learning environments they attend (Ainscow, 2005). It also embraces individual differences as a source of richness by providing equal opportunities in learning environments (UNESCO, 2009). Inclusive education is an equality-based approach that advocates for all students to be educated together, taking into account learning speeds, abilities, language, culture, disability, etc., and rejects discrimination. In these classrooms, gifted students can often be the "overlooked group" because they are generally seen as "successful," "problem-free," and "able to learn on their own" (Montgomery, 2001; Sak, 2010). It is often assumed that gifted children do not require special attention in the classroom because they are ahead of their peers, but the opposite is true. Therefore, inclusive education practices require different support strategies that cater to gifted students.

In the context of inclusive education practices, gifted students must first be identified in order to determine what types of support education strategies can be offered to them. Identification can be considered a prerequisite for meeting their needs correctly and appropriately. Educational opportunities must be fair and inclusive for gifted students to contribute to social life. Identifying students' educational needs and providing educational environments and services that meet those identified needs significantly contributes to their participation in society as independent and productive individuals (Akman, at al., 2022; Şahbaz & Kalay, 2010). Supportive educational strategies implemented through inclusive education practices can help individuals become happy, content, and eager to learn. Seizing this opportunity is also crucial for them to increase their potential.

Although there is no universal definition of the concept of “gifted/intelligent” in the literature, strategies such as enrichment, deepening, and acceleration are widely emphasized in educational practices (Kılınç & Sözer, 2024). The most fundamental belief regarding giftedness emphasizes that the individual possesses above-average general abilities (Renzulli, 1978; Gagne, 1985; OECD, 2024). They are individuals who can perform at a higher level than their peers in areas such as cognition, creativity, leadership, and the arts (Renzulli, 2005). These individuals need differentiated educational practices to realize their potential.

Inclusive education aims to create an environment where all students feel valued, respected, and supported. In addition to providing support to students, it also involves creating an atmosphere of acceptance and understanding

for students from diverse backgrounds. When students feel a sense of belonging, they are more likely to be motivated to learn, feel a sense of belonging, and develop positive relationships with their peers (İhtiyaroğlu, 2014). Inclusive education can make a significant contribution to strengthening social cohesion by enabling students to feel valued. In terms of these characteristics, it also provides suitable learning practices for gifted students.

The lack of strong policies in the field of gifted education is one of the biggest obstacles to securing funding. Ultimately, all practices related to gifted students are tied to financial considerations. Programs cannot be implemented due to insufficient funding and the lack of reliable testing and functional policies (Landrum at al., 2001). In this context, inclusive education for gifted students remains nothing more than rhetoric.

The primary goal of developing support education strategies for gifted students within the framework of inclusive education practices is to maximize students' existing potential. Determining the appropriate and necessary learning environment is also part of these support education strategies to achieve this goal.

Supportive Education Strategies for Gifted Students within the Framework of Inclusive Education Practices

1) Enrichment,

2) Acceleration,

3) Flexible Grouping,

4) Higher-Level Thinking Skills Education

5) Technology-Supported Learning,

6) Differentiation of Content,

7) Teacher Training and Awareness,

8) Monitoring and Evaluation.

1. Enrichment

Enrichment is one of the most fundamental strategies in providing inclusive educational environments. In inclusive education practices, the cognitive, emotional, and social development of gifted individuals must be holistically considered. Dynamic abilities that can be developed through learning experiences tailored to readiness levels (Clark, 2001) should be considered within the scope of enrichment.

Enrichment for gifted students involves identifying prior learning and deepening and broadening content that is tailored to their interests and needs. These efforts also contribute to accelerating the student's own learning experiences. Gifted students are individuals who already choose to invest in themselves through their own efforts and choices (Reis & Renzulli, 2009).

The principle of enrichment in both horizontal and vertical dimensions must be kept in mind throughout all work. Vertical enrichment allows for a more in-depth examination of the content, while horizontal enrichment enables it to be linked to different disciplines. For example, transforming content related to a mathematics lesson into a project is an example of vertical enrichment. If this project is also linked to different disciplines such as science and social sciences, vertical enrichment is also

achieved. In this way, gifted students enter into a learning experience where they can challenge their potential through group or individual work.

• *Vertical Enrichment (Deepening)*

The most fundamental principle of vertical enrichment is that content should be presented in a deeper and more complex way, appropriate to the student's readiness. This aims to develop the student's higher-order thinking skills, such as analysis, synthesis, evaluation, and creation. For gifted students not to become bored with learning and perceive it as an unnecessary process, they must realize that the content is not insufficient. One effective way to achieve this is through well-designed vertical enrichment.

For example, a learning experience about the lives of living things can be transformed into a study on the relationship between carbon footprints and the vital activities of living things in climate change through vertical enrichment.

• *Horizontal Enrichment (Expansion)*

The most fundamental principle of horizontal enrichment is for students to relate content to different disciplines, thereby expanding the content. Horizontal enrichment is directly related to the structuring of knowledge. It enables students to approach knowledge from multiple angles, establish connections with different fields, and apply this knowledge in these different fields. Establishing interdisciplinary relationships also develops the student's interdisciplinary thinking skills.

For example, a study on developing proposals for solving environmental problems using artificial intelligence

technology can be taken to a level that integrates different disciplines such as mathematics, computer science, sociology, and natural sciences.

Project work plays a significant role in the preparation of enrichment content. Through group or independent project work, students enrich their learning experiences both horizontally and vertically. Teacher guidance is important in this process; receiving proper guidance on the student's areas of interest and curiosity ensures that enrichment takes place in a meaningful way.

These projects, whether worked on individually or in groups, significantly develop students' skills in research, inquiry, critical thinking, problem solving, planning, and presentation. They support students in diversifying their academic abilities, creativity, understanding, intuitive learning, and ability to cope with innovation, enabling them to use analytical and synthesizing perspectives (Sternberg, 1988) in real life as well.

Enabling students to achieve meaningful learning, in other words, to connect with real life and to think about and try to find solutions to problems encountered in real life, is another contribution of enrichment strategies to gifted students. Enrichment practices should not only target cognitive development but also support higher-level skills such as problem solving, creative thinking, conscious responsibility, decision making, and leadership.

The fact that each gifted individual has differences in terms of potential and learning style is an important issue that needs to be focused on. This is because these individuals are people who have the potential to be idea

generators, enriching humanity's moral, emotional, social, academic, and aesthetic life (Tannenbaum, 1983).

Therefore, inclusive educational environments designed for gifted students should offer flexibility and diversity that the standard education system fails to provide. Planning that is responsive to students' needs and desires and is flexible enables the provision of a fair and enriching learning environment for gifted individuals.

2. Acceleration

Within the framework of inclusive education practices, acceleration for gifted students is an important issue that should be included in education policies. Acceleration is one of the effective strategies for directing gifted students to a quality education while respecting their individual characteristics. Acceleration is, in its most general definition, an educational strategy that allows students to progress more quickly in academic programs. The acceleration strategy allows the learning process to progress at the individual's own pace, regardless of the student's age or grade level. Within an inclusive education, it is necessary to offer flexible, individualized learning paths that enable each student to reach their full potential. Otherwise, they will not be able to realize their potential.

When they fail to realize their potential, they may lose their motivation to learn. When gifted students are not presented with challenges at an appropriate level, boredom, loss of motivation, the development of negative attitudes toward school, and behavioral problems are inevitable. It should not be forgotten that acceleration is a

very powerful tool for gifted students to realize their potential.

The National Association for Gifted Children (NAGC) summarizes the acceleration strategy as "students completing the traditional curriculum at an unusual pace or at a younger age," emphasizing the need to balance academic competence with motivation. There are different types of acceleration strategies, such as grade skipping, course skipping, starting school at an early age, subject-specific acceleration, enrollment in intensive programs, taking advantage of online or hybrid education models, taking some university courses while in high school, and taking international courses such as IB and AP.

Advantages of acceleration strategies:

• They continue to learn without getting bored and use their potential to the fullest.

• They use time more efficiently and save time.

• Their academic satisfaction and sense of achievement increase.

• The opportunity to graduate early and advance their career

• Feeling more socially and emotionally compatible with their peers

• Becoming productive at an early age and having the opportunity to contribute to fields such as science, art, and technology earlier.

Another factor to consider in acceleration programs is the student's social and emotional readiness. Programs that focus solely on cognitive readiness may lead to disappointment in terms of expected positive outcomes. When acceleration programs are planned according to the student's level, they have meaningful academic benefits; however, when their social and psychological effects are considered, they can cause negative or significant harm (Rogers, 1992). Therefore, it is important to carefully monitor the learning process in the acceleration program and for families and teachers to collaborate in this process. At the same time, educational policies regarding grade skipping, taking university courses, etc. should be determined, and legislation and regulations should be prepared. In its 35-year longitudinal study, NAGC emphasized that acceleration did not negatively affect social or emotional development; on the contrary, many students evaluated their acceleration experience positively. Contrary to the view that acceleration may create social adjustment problems and potential negative effects by pairing students with peers older than themselves, the literature indicates that this situation is generally exaggerated (Rogers, 1992; Wardman, 2017).

3. Flexible Grouping

Flexible grouping plays a significant role in effectively supporting students in inclusive educational settings. It is often difficult to meet the needs of gifted students for rapid and in-depth learning in standard classroom settings (Ayas & Çoban, 2018). One way to overcome this problem is through flexible grouping strategies.

Flexible grouping is a strategy for creating learning groups with non-permanent, dynamic structures. It is a

strategy that allows gifted students to learn in different group structures at specific times according to their potential, readiness, interests, and learning styles (Tomlinson, 2001). Flexible grouping can include homogeneous and heterogeneous group structures and allows for differentiation within the classroom. It supports students' cognitive development by allowing them to learn at their own pace (Maker & Shiever, 2010). Furthermore, this strategy enables students to collaborate with peers of different ability levels in order to support their social-emotional development (Tomlinson, 2001). This strategy contributes positively to academic achievement, allowing students to learn more deeply by working in peer groups where their interests and needs can be met. Flexible grouping does not aim to bring together only individuals with similar abilities. It focuses on groupings that enable gifted students to interact with students of different ability levels. This contributes to the development of social skills such as empathy, leadership, and social responsibility (Ayas & Çoban, 2018).

Students can work in different groups based on their ability, interest, or readiness level:

• Homogeneous groups: Special study groups for advanced students

• Heterogeneous groups: Development of cooperation and social skills

• Groups can be changed dynamically.

For flexible grouping to be effectively implemented for homogeneous, heterogeneous, or dynamic groups, the teacher's role and qualifications must be well defined.

Flexible grouping activities are group work that can be carried out by a teacher who has high cognitive flexibility and is open to pedagogical adaptation. The teacher's lack of adequate equipment can negate the positive effects of flexible grouping (Maker & Shiever, 2010). For this strategy to be successful, teachers' professional development must be supported and all necessary resources for classroom implementation must be provided (UNESCO, 2009).

4. Higher-Order Thinking Skills Education

Higher-order thinking skills are an effective and important set of skills in the education of gifted students. Although there are different definitions and classifications in the literature regarding which skills constitute higher-order thinking skills, it is widely accepted that teaching strategies should be differentiated to meet students' needs.

The education of gifted individuals is supported by programs tailored to their individual areas of talent, aiming not only to develop cognitive skills but also creative thinking, problem-solving, leadership, and social skills (Ross, 1993). Therefore, the need to differentiate programs for gifted individuals stems from the inadequacy of existing programs in meeting the needs of these individuals. Programs must be tailored to individual talent areas and aim to develop not only cognitive skills but also creative thinking, problem solving, leadership, and social skills (Ross, 1993). It is planned and goal-oriented, aiming to maximize existing skills and talents in the learning process, and is defined in the literature as “talent development” (Clark, 2001).

The first definition of higher-order thinking skills in the literature, according to Bloom's Taxonomy, is analysis, synthesis, and evaluation. With the revised taxonomy, the evaluation level has been moved down a level, and the synthesis level has been expressed as ‘creation’ at the highest level.

In the literature, higher-order thinking skills are not limited to cognitive process elements but are addressed in a broader and more multi-component manner:

- Critical thinking
- Creativity / Innovative thinking
- Problem solving
- Metacognition
- Teamwork / Collaboration
- Innovation / Innovative Development
- Digital literacy / Thinking with technology (Lo & Feng, 2020; OECD, 2024; Hamzah at al., 2022).

Any grouping, staging, or definition related to higher-order thinking skills complements each other and prepares for the previous or subsequent process. Therefore, rather than a very strict grouping specific to higher-order thinking skills, there is a need to create a definition that ensures measurability. It has been stated that applications such as open-ended questions, discussion and debate activities, and critical and creative thinking workshops are effective practices that serve higher-order thinking skills.

For example, there is a need for a perspective that produces original solutions by thinking outside the box, critically questions information in order to generate new ideas, and can critique arguments when necessary. If this idea generation process is to be effective and efficient, the individual's metacognitive skills must also be well-developed. This is because they must also be able to plan, monitor, and evaluate the ideas that emerge within their own thought processes. As can be seen, it is not possible to say that higher-order thinking skills are independent of each other in terms of stages and processes.

Highly gifted individuals possess higher-level thinking skills compared to their peers, but they also require systematic development of these skills. However, various studies indicate that highly gifted students are often neglected in inclusive educational environments. If a teacher in a classroom has low awareness of gifted individuals, the inclusive educational environment can become disadvantageous for these students. The development of these students can be supported through factors such as a flexible curriculum and the development of teachers' awareness of gifted individuals (Tomlinson, 2004).

There is a need for structured programs and differentiated teaching strategies that support the development of higher-order thinking skills. When determining these strategies, learning processes can be enriched and deeper thinking encouraged by integrating skills such as creative and critical thinking into complementary content (Reis et al., 2004). For example, in geography lessons, when the goal is to teach conceptual skills as well as spatial thinking skills, this has a beneficial effect in helping

students access higher-level thinking processes (Şanlı & Kırkkeser, 2025).

Some of the recommended practices in this context are:

• Encouraging deep thinking

• High levels of cognitive and affective interaction

• Providing content tailored to individual learning styles

• Developing interdisciplinary projects.

Clear criteria must be established to determine the level at which higher-order thinking skills have been developed and the extent to which they have progressed from their initial state. Feedback during the evaluation phase plays a crucial role in determining the effectiveness of support education strategies developed within the scope of inclusive education, as well as in renewing, continuing, and transforming these strategies.

Higher-order thinking skills must now be addressed within a broader framework that encompasses not only cognitive elements such as “analyze, evaluate, create,” but also components such as metacognition, collaboration, innovation, and digital literacy. With this perspective, effective learning and teaching processes should be planned from the students' perspective through the creation of appropriate learning environments, content, processes, and assessments.

In terms of teaching methods, prioritizing active learning, collaborative processes, technology integration, and metacognitive strategies will again serve the individual differences of gifted students. The recent popularity of

digital and online learning is particularly advantageous in terms of saving time. However, its negative aspects, such as social isolation and communication problems, should not be overlooked. Factors such as organic and variable interaction between teachers and students and feedback are critical determinants of the quality of learning and success.

When assessing a student who is likely to be gifted, the decision as to whether or not the student is gifted should not be based on a single test or a single type of test (Shaunessy, 2003). Five primary indicators have been identified for K-12 students to measure the development of higher-order thinking skills:

• Problem-solving skills

• Metacognitive skills

• Critical thinking skills

• Teamwork

• Innovation development skills (Liu at al., 2024)

5. Technology-Supported Learning

Technology-supported learning can be utilized to provide education tailored to the individual learning speeds and interests of gifted students. Technology-supported learning opportunities can make learning processes more effective, personalized, and interactive through the integration of technological tools. These include e-learning platforms, coding and artificial intelligence workshops, virtual laboratories, and simulations prepared with the help of technological tools such as computers,

tablets, online platforms, artificial intelligence, and virtual reality.

It offers students opportunities for learning independent of time and place. When this opportunity is taken into account, it will be easier for them to access accelerated advanced courses in line with the concept of flexibility, which is one of the characteristics of inclusive education. Thanks to virtual reality and artificial intelligence applications, they will be able to access application areas that serve their individual differences and needs, such as product design, project development, and experiential learning. In particular, they will be able to participate in research that offers opportunities for global collaboration and intercultural interaction, such as learning about and participating in international projects.

When looking at the benefits of technology-supported education in a general framework, they can be listed as: adapting to individual differences, high motivation to learn, opportunities for learning outside the classroom, accelerating the feedback process, making the learning process enjoyable, accessing in-depth content beyond standard content, and developing higher-order thinking skills. Gifted individuals should be encouraged to view technology not merely as a tool for entertainment, but as a facilitator in their learning experiences. This awareness can contribute to the development of their higher-order thinking skills as a triggering factor.

In their experimental studies, Çırak and Uygun (2023) concluded that a mathematics teaching program enriched with technology-supported activities had a significant impact on the mathematics achievement of gifted students. Similarly, Maba and Sakar (2025) emphasized

that technology-supported active learning can also contribute to areas such as art and creativity. The continuity of the positive contributions revealed by the research is directly proportional to the quality of the infrastructure and teacher training. When these two factors are not provided, it is not possible to refer to the use of technology as a supportive educational strategy.

When considering that gifted students may also struggle to adapt due to their social-emotional structures in technology-supported education, it is necessary to monitor situations that may arise from reduced social interaction. Teachers and family support should be provided to guide students on issues such as the risk of technology addiction and ethical use. It is crucial to remember that technology is a tool, not an end in itself, and to integrate technology with a pedagogically grounded approach. The disadvantages of technology-supported education can be eliminated with other support strategies.

6. Differentiating Content - Differentiating the Curriculum

Differentiating or enriching content begins with deciding what to teach. Accelerated or deepened content should be presented to students in a structure combined with advanced-level resources. This enables gifted students to learn at a deeper cognitive level and increases their motivation (Sak, 2010).

Offering elective courses that gifted students can choose based on their interests and abilities also falls under the scope of differentiating content. These include elective courses in fields such as science, technology, art, and

mathematics, preparation clubs for competitions and Olympiads, and participation in independent project groups.

Gifted individuals possess skills such as faster learning, abstract thinking, and complex problem-solving, so standard programs and content can become inadequate, slow, and boring for them. To reduce the risk of academic boredom (Colangelo at al., 2004), differentiation in the curriculum and content is necessary for gifted individuals. Providing enriched content will also increase their academic motivation. Conducting in-depth analyses of topics rather than superficial presentations (VanTassel-Baska & Stambaugh, 2005) also enables them to achieve academic satisfaction.

7. Teacher Training and Awareness

One of the most important support strategies for gifted students in inclusive education is determining the role of the teacher. It is a significant and critical responsibility for teachers to recognize, support, and guide gifted students. The role of the teacher in inclusive education has been reexamined with the development of modern educational understanding.

Teachers are in a position to most easily connect with gifted individuals and establish a reliable and meaningful bond. They should collaborate with families to support the student's development both inside and outside of school by establishing continuous and effective communication. Teachers need competent guidance on what types of support strategies they can use in the classroom to address the student's profile. Teachers should be supported in developing their ability to

recognize and guide gifted individuals, their ability to provide emotional and social support, their ability to structure a learning process in collaboration with families, and their ability to differentiate in terms of content, product, process, and assessment. This support is a prerequisite for teachers to fulfill the aforementioned role.

• Training to raise awareness about gifted individuals

• Understanding differentiation techniques in content, process, and assessment stages

• Establishing counseling systems to guide teachers who mentor gifted individuals

• Mentoring and peer coaching systems must be widespread in schools.

Conducting an independent, accelerated, layered project focused on deepening the content offered to gifted students, selecting it according to students' interests, and viewing their interests as part of the content and learning experience can be achieved thanks to the teacher being an excellent guide.

It is important for teachers to accompany students in providing social-emotional support by recognizing situations such as social isolation, perfectionism, restlessness, and inability to achieve satisfaction among gifted students (Cross, 2001). Guiding them to receive support in matters of peer bullying, empathy, and emotional situations, as well as mentoring them, is a critical issue. Teachers must not overlook the need to monitor and take precautions not only for cognitive but also for social-emotional needs.

In addition to all this, let us assume that teacher training provides competence and qualifications. If there are no issues such as large class sizes, inadequate equipment, insufficient in-school guidance to support teachers, or unclear education policies, it will be challenging for teachers. Let us assume that there is a teacher who does not want to ignore a gifted student despite all these conditions. This time, other students in the class may feel that this student is being treated preferentially and may feel a sense of 'injustice'. This situation may cause inconsistency with the egalitarian principle of inclusive education. At this point, the way for the teacher to manage the entire process correctly is again through 'teacher training'.

8. Gifted Individuals and Assessment

The assessment process for gifted individuals should be structured not only to measure their performance but also to understand their learning styles, discover their potential, and encourage their creativity. This process requires the use of qualified, flexible, and multidimensional assessment tools. Process-oriented and qualified methods should be preferred. Examples include portfolio assessment, performance tasks, analytical rubrics that assess the level of complex skills, self-assessment and peer assessment, and metacognitive awareness (Callahan at al., 2017). For example, it may be appropriate to conduct a project-performance task that requires long-term work and addresses the solution to a problem encountered in real life.

Gifted individuals may possess high-level cognitive skills that are difficult to measure with standard tests. They may exhibit exceptional learning speeds and learning styles.

Traditional assessment practices (e.g., multiple-choice tests) may not fully reflect the potential of these students (Baska & Little, 2017). Therefore, their development processes should be closely monitored through portfolio work, continuous feedback, peer and self-assessment, and support strategies should be updated or modified as needed. All assessment and evaluation activities can be thought of as aids in the individual's learning journey. The essence of assessment and evaluation should be to help students recognize signposts, crossroads, hills, and bumps along the way and to guide them to continue.

Highly gifted students are naturally inclined toward technology, so digital tools and alternative methods can be effective in the assessment process:

• E-portfolio systems (e.g., Seesaw, Padlet)

• Online project presentations and blogs

• Gamified assessment

• Digital creative writing, coding products (Reis & Renzulli, 2009)

The assessment and evaluation of gifted students should not consist solely of tests with a single correct answer. The desired outcomes of the assessment should be structured in a way that allows for different and original solutions. While measuring a goal that is appropriate for the student's individual differences and pace of development, it should not be forgotten that characteristics such as perfectionism and test anxiety may also be reflected in the assessment and evaluation. Assessment should be offered with flexibility appropriate to the student, rather than within a fixed time frame, as

this will be more suitable for their social and emotional characteristics. The basis of assessment should be grounded in monitoring their development, providing feedback, and making the learning process more effective.

In summary

This section discusses inclusive education, an approach that aims for all students to learn together, equally, and with respect for their differences, and examines which strategies should be implemented in the context of gifted students. Understanding the 'learning styles' of gifted students is the main focus. Efforts have been made to highlight the need to identify support education strategies that meet their needs and to provide specific support where necessary to maximize their individual potential. The most fundamental challenge in inclusive education is that gifted students are often seen as "successful" and may be neglected.

The primary goal of support strategies in inclusive education is to support the cognitive, emotional, and social development of gifted individuals. The prerequisites for the effective implementation of support strategies are accurate diagnosis followed by differentiated learning environments. However, funding shortages, inadequate education policies, and implementation issues pose significant obstacles in this process.

In order for gifted students to fully realize their potential, it is necessary to develop their thinking skills, integrate technology, differentiate content, provide qualified teachers, and implement appropriate assessment systems.

All of these should be provided within an inclusive education approach that is sensitive to individual needs and flexible.

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CHAPTER 9

USE OF TECHNOLOGY FOR GIFTED STUDENTS WITHIN THE FRAMEWORK OF INCLUSIVE EDUCATION PRACTICES

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Introduction

Inclusive education has evolved into a comprehensive framework that emphasizes the participation, engagement, and success of all learners—regardless of ability level, cultural background, or learning profile. Although gifted students are often presumed to excel academically with minimal support, their experiences within inclusive classrooms reveal complex patterns of unmet needs, under-stimulation, and social-emotional mismatch (Subotnik, Olszewski-Kubilius, & Worrell, 2019). In Türkiye, similar challenges have been highlighted by Kurnaz and Doğan (2020), who emphasize that gifted learners frequently face curricular limitations, insufficient differentiation, and a lack of opportunities to cultivate higher-order thinking in mainstream classrooms.

The growing emphasis on technology in education has opened new pathways for these challenges to be addressed. Digital tools enable personalized learning environments, foster scientific creativity, and allow gifted learners to explore concepts beyond grade-level expectations (Kaufman & Sternberg, 2021). Within inclusive education, technology supports not only accessibility but also enrichment, extension, and student autonomy—core elements needed for gifted education.

To ground these practices, inclusive pedagogy must be aligned with frameworks such as Universal Design for Learning (Meyer, Rose, & Gordon, 2014), differentiated instruction (Tomlinson, 2017), and scientific creativity theory (Hu & Adey, 2002). The purpose of this chapter is to synthesize these frameworks and demonstrate how technology can be meaningfully integrated to support

gifted learners academically, socially, and creatively within inclusive settings.

Method

Scientific Creativity and Gifted Learners

Scientific creativity is defined as the ability to generate novel and valuable ideas within scientific contexts (Hu & Adey, 2002; Runco & Jaeger, 2012). Gifted learners benefit from environments that support inquiry, experimentation, and interdisciplinary thinking. Research in Türkiye similarly demonstrates that STEM-oriented learning significantly promotes scientific creativity when supported by digital tools (Kılıç & Kaptan, 2021).

Differentiation Strategies for Inclusivity

Differentiated instruction provides a pedagogical foundation for meeting diverse learning needs within inclusive classrooms (Tomlinson, 2017). Strategies such as curriculum compacting, tiered assignments, and flexible grouping ensure that gifted learners engage with challenging content. Technology supports differentiation through adaptive systems, multimedia tools, and digital project-based environments (Reis & Renzulli, 2021).

Universal Design for Learning (UDL)

UDL principles—multiple means of representation, engagement, and expression—guide the design of accessible and challenging learning environments (Meyer, Rose, & Gordon, 2014). Technology integration enhances teacher capacity for UDL-aligned instruction by supporting autonomy, accessibility, and multimodal engagement (Özdemir & Çakır, 2019)

Methodological Approach

This chapter uses a conceptual and integrative methodology to synthesize research from gifted education, creativity studies, and inclusive digital pedagogy, proposing a framework for technology-supported inclusion.

Results and Discussion

Technology as a Catalyst for Scientific Creativity

Digital platforms foster scientific creativity by supporting inquiry, visualization, and experimentation. Tools such as PhET simulations, NASA digital labs, and coding environments allow learners to construct meaning through active investigation (Barak & Dori, 2016). Gifted students benefit from tasks requiring hypothesis testing, variable manipulation, and model-building—opportunities typically absent from standard curricula. Coding tools such as Scratch, Python notebooks, and Tinkercad promote computational creativity and interdisciplinary thinking (Brennan & Resnick, 2012).

Differentiated Digital Practices

Technology offers powerful opportunities for scalable differentiation. Adaptive learning systems provide acceleration pathways for gifted learners while maintaining inclusivity. Digital storytelling tools such as Book Creator and Pixton enable gifted students to demonstrate mastery through multimodal formats. Project-based digital environments, including Minecraft Education Edition and CoSpaces EDU, allow tiered assignments aligned with Tomlinson's (2017) content–process–product differentiation model.

Teacher Roles in Technology-Supported Inclusion

Teachers act as designers, facilitators, and reflective practitioners. Technology-enhanced gifted education is most effective when teachers adopt growth-oriented beliefs about giftedness (Dai, 2020). Professional development is essential to support digital pedagogy and differentiated instruction (Ertmer & Ottenbreit-Leftwich, 2020). In Türkiye, teacher preparedness and perceptions significantly affect the success of technology-supported inclusion (Kurnaz & Doğan, 2020).

Ethical and Equity Considerations

Equitable access remains a global challenge (OECD, 2021). Ensuring inclusive participation requires infrastructure investment, teacher training, and responsible digital citizenship education. Ethical awareness is essential for guiding gifted students in digital research and innovation (Cross & Cross, 2022).

Summary of Findings

Findings suggest that technology enhances scientific creativity, supports effective differentiation, increases engagement, transforms teacher roles, and raises ethical and equity considerations that must be addressed for sustainable implementation.

Conclusion

Technology provides powerful opportunities to support gifted learners within inclusive classrooms. When grounded in Universal Design for Learning (UDL), differentiated instruction, and scientific creativity frameworks, digital tools extend learning beyond

conventional curricular limits, enabling gifted students to engage in exploration, inquiry, and innovation at appropriate levels of challenge.

However, technology alone is insufficient. The success of technology-supported inclusive education depends on teachers' expertise in digital pedagogy, equitable access to resources, and ethical digital citizenship practices. Teachers must act as facilitators, designers, and reflective practitioners who understand the developmental nature of giftedness and cultivate learning environments that support autonomy and creativity.

Future research should investigate how artificial intelligence, adaptive analytics, and immersive digital environments can individualize gifted education while maintaining social connection and human agency. Educational policy should prioritize professional development, infrastructure support, and enriched pathways for gifted learners within inclusive settings.

Ultimately, inclusive education for gifted students must ensure equal access to opportunity—not equal uniformity. Technology, when meaningfully integrated, serves as both a bridge and a catalyst, helping gifted learners thrive academically, socially, and creatively within diverse learning communities.

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CHAPTER 10

CASE STUDIES and CROSS-CULTURAL PERSPECTIVES

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Introduction

Gifted education has traditionally been framed around cognitive capacity and academic performance, based on the assumption that intelligence and talent can be universally defined and measured. Recent research, however, increasingly demonstrates that the emergence, identification, and educational support of giftedness are shaped by cultural, social, and institutional contexts. Societal interpretations of achievement, potential, and ability influence who is identified as gifted and which educational opportunities become accessible, indicating that giftedness cannot be understood independently of cultural meaning systems (Sternberg, 2021; Dai, 2020).

A cross-cultural perspective challenges the notion of uniform models of gifted education by highlighting variation in identification practices, program structures, and pedagogical priorities across countries. These differences reflect historically embedded educational traditions, social expectations, and policy orientations, suggesting that giftedness is not merely an individual attribute but a socially constructed phenomenon (Nisbett, 2003; OECD, 2023). From this perspective, gifted education becomes a site where broader cultural values regarding learning, success, and social contribution are enacted.

Case studies provide a particularly effective means of examining this complexity. By situating educational practices within their natural contexts, case studies allow for analysis of not only formal program structures but also underlying values, pedagogical assumptions, and implementation dynamics. This approach is especially useful for explaining why similar programs may produce

different outcomes across cultural settings (Yin, 2018; Bartlett & Vavrus, 2017).

Building on this framework, the chapter adopts a cross-cultural case study approach to examine gifted education models in different national contexts. It explores how giftedness is culturally constructed and how cross-cultural approaches to gifted education balance universal educational principles with local values, with the aim of informing context-sensitive curriculum development, program design, and educational policymaking (UNESCO, 2021; Subotnik et al., 2019).

Theoretical Framework

Understanding cross-cultural differences in gifted education requires clarification of the theoretical frameworks through which giftedness is conceptualized. Dominant approaches reflect underlying assumptions about intelligence, ability, and development, many of which are culturally situated. This section examines whether giftedness should be understood as a universal construct or as a context-dependent phenomenon shaped by social and cultural conditions (Sternberg, 2007; Dai, 2020).

The Cultural Construction of Giftedness and Talent

Although giftedness and talent have long been conceptualized as universal, culture-free cognitive attributes, contemporary perspectives increasingly emphasize their social and cultural construction. Interpretations of knowledge, achievement, and potential vary across societies and directly shape which characteristics are recognized as gifted. From this

viewpoint, giftedness is embedded in cultural values and normative expectations rather than existing solely as an individual capacity (Sternberg, 2021; Dai, 2020).

Definitions of giftedness differ substantially across cultural contexts. Western-oriented models tend to prioritize cognitive performance and measurable academic achievement, whereas other contexts emphasize attributes such as social responsibility, leadership, moral development, or contribution to the community. These differences indicate that giftedness is inherently multidimensional, with different ability domains gaining prominence depending on culturally specific priorities (Phillipson, 2023; OECD, 2023).

Related concepts such as achievement, potential, and talent are likewise culturally contingent. Achievement may be defined through standardized assessment in some systems, while in others it is associated with collaboration or social engagement. Potential may be viewed either as a stable trait to be identified early or as a dynamic capacity that develops over time, and talent may encompass academic as well as artistic, social, and leadership abilities (Gagné, 2021; Plucker et al., 2022). Recognizing these variations calls for a critical reassessment of models that treat giftedness as culturally neutral and universally applicable.

Cross-Cultural Approaches in the Education of Gifted Learners

Much of the gifted education literature has historically been grounded in Western-centered models emphasizing individual achievement, selectivity, and competition. While these models have contributed to systematic

program development, they often universalize culturally specific norms and provide a limited account of how giftedness is expressed in diverse contexts (Dai, 2020; Sternberg, 2021).

Cross-cultural critiques highlight that a strong focus on academic performance may marginalize alternative expressions of giftedness in cultures that prioritize communal values, social responsibility, or moral development. Such biases may lead to inequitable identification practices and exclusion of certain learner groups. Consequently, cross-cultural scholarship emphasizes context-sensitive approaches rather than singular, universal models (Plucker et al., 2022; Phillipson, 2023).

Culturally responsive approaches stress alignment between program design and local values, educational traditions, and institutional conditions. By integrating cognitive development with cultural identity and social experience, these approaches enhance relevance and learner engagement. At the same time, cross-cultural frameworks seek to balance universal educational goals—such as critical thinking and creativity—with locally grounded values, enabling gifted learners to participate meaningfully in both local and global contexts (Leung & Liou, 2021; UNESCO, 2021).

The Role of the Case Study Method in Gifted Education Research

Methodological choices are particularly important in gifted education research due to the context-dependent nature of the field. Although experimental designs are useful for examining causal relationships, they often fail

to capture the cultural, institutional, and pedagogical complexity of gifted education. By controlling contextual variables, experimental approaches are less suited to addressing "how" and "why" questions (Yin, 2018; Creswell & Poth, 2018).

Case studies examine educational practices within their natural settings, illuminating interactions among policy frameworks, school cultures, and instructional practices. Identification and support processes in gifted education are multidimensional and cannot be reduced to isolated variables. In cross-cultural research, case studies are especially valuable for explaining why similar programs acquire different meanings and produce different outcomes across contexts (Bartlett & Vavrus, 2017; Thomas, 2021).

Although case studies are sometimes criticized for limited generalizability, their purpose lies in analytic rather than statistical generalization. Through systematic comparison and use of multiple data sources, case studies provide theoretically informative insights into how gifted education operates within specific cultural contexts (Gerring, 2017; Tracy, 2020). As such, they constitute an indispensable methodological approach for cross-cultural research in gifted education.

Method

This study adopts a cross-cultural case study design focusing on Germany, Finland, and South Korea. These countries were selected because they represent distinct approaches to gifted education in terms of identification practices, program structures, and cultural priorities, providing a strong basis for comparative analysis. Rather

than seeking a universal model, the selection aims to highlight analytical contrasts that illustrate how gifted education is shaped by cultural, political, and pedagogical contexts (Phillipson et al., 2020; OECD, 2023).

Germany was selected as a case characterized by early identification, selective tracking, and a federal education structure. Its multi-tiered system places strong emphasis on academic performance and cognitive criteria, making it a relevant context for examining selectivity, institutional differentiation, and academic specialization in gifted education (Ziegler et al., 2021; Phillipson, 2023).

Finland represents an inclusive and school-based model grounded in ethical sensitivity. Giftedness is not treated as a privileged category but is addressed within the general education system through differentiated instruction and individualized support. This case offers insight into how equity, social justice, and holistic student development can be integrated into gifted education (Tirri & Kuusisto, 2020; OECD, 2024).

South Korea was selected as a contrasting East Asian model characterized by high academic expectations, intense competition, and a strong emphasis on STEM excellence. Gifted education is closely aligned with national development goals, positioning gifted learners as strategic human capital. This case allows examination of how collective achievement and academic excellence shape educational aims and practices (Park, 2021; Kim & Lee, 2022).

Together, these cases illustrate variation along a selectivity–inclusivity–competition continuum.

Representing Western Europe, Northern Europe, and East Asia, they enable a context-sensitive comparison of how cultural values, education policies, and pedagogical priorities shape gifted education (Bray et al., 2021; Steiner-Khamsi, 2020).

Case Selection Process

Case selection was guided by theoretical and methodological considerations aimed at capturing cross-cultural variation rather than statistical representativeness. Consistent with case study logic, the focus was on analytically informative cases that enable in-depth, context-sensitive comparison (Yin, 2018; Gerring, 2017).

Country-level selection targeted institutionalized approaches to gifted education embedded in distinct policy frameworks. National systems reflect broader educational ideologies, societal values, and historical trajectories, making country-based comparison suitable for analyzing both pedagogical and governance dimensions of gifted education (Phillipson et al., 2020; OECD, 2024).

Institutional contexts within each system were also considered critical, as policy implementation often varies across schools and programs. Selected institutions thus function as sites where policy–practice interactions and contextual adaptations can be meaningfully examined (Hallinger et al., 2023).

The presence of formal gifted education programs constituted a key selection criterion. Programs involving acceleration, enrichment, domain-specific specialization,

or individualized learning pathways were prioritized, provided they had clearly articulated goals, structured content, and documented implementation processes to ensure analytic coherence and comparability (Olszewski-Kubilius et al., 2021; Peters et al., 2022).

Comparability was established through shared analytical dimensions—definitions of giftedness, identification practices, program aims, pedagogical strategies, and value orientations—rather than surface-level similarities. This approach enabled functional and conceptual comparison beyond descriptive contrasts (Bartlett & Vavrus, 2017; Bray et al., 2021).

Finally, case selection was informed by a logic of contextual equivalence. Differences in socioeconomic conditions, institutional structures, and historical development were explicitly considered during interpretation, supporting an understanding of gifted education based on adaptable principles rather than context-free "best practices" (Ragin, 2018; Steiner-Khamsi, 2020).

Data Collection Methods

Data collection was designed to capture cross-cultural variation in gifted education through multiple sources, enhancing contextual depth and analytic credibility. In line with the case study approach, data sources included curriculum and policy documents, textbooks and instructional materials, program goals and learning outcomes, and—where feasible—interviews with teachers, administrators, or experts (Creswell & Poth, 2018; Yin, 2018).

Curriculum frameworks and policy documents were analyzed to examine official definitions, priorities, and ideological assumptions underlying gifted education at national and regional levels (OECD, 2023; UNESCO, 2021).

Textbooks and instructional materials were examined as sites where pedagogical priorities and cultural messages are enacted in practice. Their content and representations provided insight into the hidden curriculum and implicit value transmission (Apple, 2019; Luke, 2018).

Program goals and learning outcomes were analyzed to identify intended educational results, with attention to cognitive, affective, and social dimensions, enabling cross-cultural comparison of how achievement and ability are conceptualized (Tomlinson et al., 2021; Plucker et al., 2022).

Where available, interviews with practitioners and experts complemented document analysis by providing experiential insights into policy implementation, contextual adaptations, and potential policy–practice gaps (Merriam & Tisdell, 2016; Guest et al., 2018).

The use of multiple data sources supported data triangulation, strengthening methodological rigor and consistency across cases (Yin, 2018; Creswell & Poth, 2018).

Data Analysis Procedures

Data analysis was conducted within a qualitative framework aimed at identifying cross-cultural similarities and differences at both conceptual and contextual levels. Given the diversity of data sources, a systematic and

integrative approach was adopted, combining thematic analysis with cross-cultural comparison (Braun & Clarke, 2021; Creswell & Poth, 2018).

Thematic analysis involved close reading of the data, generation of initial codes, and synthesis into higher-order themes. This process enabled systematic comparison of discourses, goals, pedagogical emphases, and value orientations across cases (Braun & Clarke, 2019; Guest et al., 2018).

Cross-cultural comparison functioned as the central analytic strategy, focusing on how similar themes acquired different meanings across contexts rather than ranking systems. This approach aligns with contemporary comparative education perspectives emphasizing context-sensitive interpretation (Bartlett & Vavrus, 2017; Bray et al., 2021).

Particular attention was given to values, pedagogical approaches, and implicit messages embedded in curricula and instructional materials. Beyond explicit objectives, the analysis examined how giftedness was framed through the hidden curriculum, including which values were prioritized and which learning practices were encouraged (Apple, 2019; Luke, 2018).

Analytic rigor was enhanced through systematic comparison across data sources. Themes derived from documents were interpreted alongside interview data where available, reducing reliance on single-source interpretations and strengthening analytic triangulation (Yin, 2018; Tracy, 2020).

Overall, the combined use of thematic analysis and cross-cultural comparison enabled a nuanced, context-sensitive examination of gifted education across cases, consistent with the aims of the study.

Germany

Germany presents a model of gifted education characterized by early identification, selective placement, and institutional differentiation. Within a federal system, policies and practices vary across Länder, producing noticeable differences in both program structures and identification procedures. Nonetheless, giftedness is generally associated with high cognitive capacity and academic performance and is supported through a range of specialized mechanisms within the education system (Ziegler et al., 2021; Phillipson, 2023).

Identification practices in Germany rely predominantly on psychometric assessment and academic indicators. Intelligence tests, teacher nominations, and school achievement commonly constitute the core components of identification. Although some Länder have increasingly adopted multi-criteria and developmental approaches, early tracking and selectivity remain central features shaping educational trajectories. While these mechanisms aim to detect potential early, they also raise concerns about cultural and socioeconomic bias in access to identification and services (Peters et al., 2022; Dai, 2020).

Program provision for gifted learners typically takes the form of differentiated school types, special classes, and enrichment-based support. Gymnasium schools often function as key sites for academically demanding

pathways, complemented by university-linked early academic initiatives and mentoring opportunities. Programs emphasize both acceleration within the standard curriculum and domain-specific deepening, with a strong focus on disciplinary expertise and scientific reasoning—reflecting an assumption that giftedness is best cultivated through academic specialization (Ziegler & Stoeger, 2019; Olszewski-Kubilius et al., 2021).

Although academic goals are highly prioritized, socio-emotional aims tend to occupy a secondary position. Critical thinking, problem solving, and depth of subject knowledge feature prominently as intended outcomes. Some initiatives have begun to incorporate self-regulation, motivation, and social adjustment more explicitly, yet these elements are not consistently embedded across programs at system level (Subotnik et al., 2019; Worrell et al., 2021).

Cultural values are reflected in emphases on achievement, discipline, specialization, and individual academic responsibility. The system broadly seeks to identify talent early and translate it into social and economic contribution, thereby legitimizing selective provision and institutional differentiation. In this sense, the German case illustrates a context in which universal academic aims are tightly interwoven with nationally salient cultural expectations (OECD, 2024; Phillipson, 2023).

Overall, Germany exemplifies a selective, academically oriented, and institutionally differentiated model. Strong alignment among identification practices, program structures, and goals points to a systematic approach supported by cultural values, while also prompting

critical reflection regarding equity, inclusivity, and the possibility of later-emerging potential.

Finland

Finland represents an approach centered on inclusion, equity, and holistic development rather than selectivity and separation. Giftedness is generally not framed as a sharply bounded category; instead, it is treated as part of normal learner variability. The emphasis is placed on supporting emerging potential within everyday learning processes rather than attaching early labels (Tirri & Kuusisto, 2020; OECD, 2024).

Consistent with this orientation, Finland deliberately avoids selective mechanisms based on standardized testing for identifying gifted learners. Identification is largely grounded in teachers' professional judgment, sustained observation, and evidence from students' learning progress and classroom performance. This reflects an understanding of giftedness not as a fixed, easily measurable attribute, but as a dynamic capacity that can develop under supportive learning conditions. Such flexibility is also intended to mitigate inequalities associated with socioeconomic and cultural differences (Peters et al., 2022; Dai, 2020).

Program structures are typically embedded within the general education system through differentiated instruction and individualized supports rather than separate schools or tracks. High levels of teacher autonomy enable adaptation of classroom practices to students' learning pace and interests. Enrichment activities, project-based learning, and interdisciplinary work are commonly used to meet advanced learning

needs in inclusive settings (Tomlinson et al., 2021; Sahlberg, 2021).

Finland's model tends to balance academic aims with socio-emotional development. Alongside cognitive goals such as critical thinking, problem solving, and creativity, programs foreground well-being, ethical sensitivity, and social responsibility. This emphasis on educating the whole person distinguishes the Finnish approach and links gifted education to broader social and moral educational purposes (Tirri, 2017; Kuusisto et al., 2021).

Cultural values are most visible in commitments to equity, trust, justice, and ethical responsibility. Rather than legitimizing gifted learners as a privileged group, the system frames them as students with distinctive learning needs who should be supported within an inclusive and socially cohesive education model. Consequently, gifted education becomes aligned with aims of social cohesion and sustainable development (UNESCO, 2021; OECD, 2023).

In sum, Finland demonstrates how a context-sensitive and ethically oriented model can support advanced learners without relying on selective identification or institutional separation. Teacher autonomy and differentiation function as key mechanisms, providing a strong counterpoint to more selective systems in cross-cultural comparison.

South Korea

South Korea offers an East Asian model of gifted education characterized by high academic expectations, intense competition, and a strategic human-capital

orientation. Within a cultural frame that closely ties individual achievement to national development and global competitiveness, giftedness is frequently conceptualized as a form of potential—especially in STEM—that should be identified early and systematically cultivated toward academic excellence (Park, 2021; Kim & Lee, 2022).

Identification is largely selective and performance-based. Standardized examinations, academic records, and competitive selection procedures are widely used to channel high-performing students into specialized programs. This approach reflects an assumption that potential can—and should—be determined early and with relative certainty, often producing learning environments marked by strong pressure and elevated expectations (Peters et al., 2022; Dai, 2020).

Program provision typically relies on specialized schools, science high schools, and nationally structured initiatives. These programs emphasize advanced STEM content, accelerated curricula, and domain-specific deepening. Early partnerships with universities, participation in research projects, and preparation for international science competitions are common features, reinforcing an orientation toward academic productivity and international achievement (Kim & Lee, 2022; Subotnik et al., 2019).

Academic objectives are explicitly dominant. High-level cognitive performance, complex problem solving, and scientific reasoning constitute core expected outcomes. Socio-emotional aims, however, tend to receive less systematic attention. Research has linked such performance-centered environments to elevated risks of

stress, burnout, and psychological strain among high-ability learners. Although some recent reforms have sought to strengthen counseling and psychosocial supports, competitive logics remain influential across the system (Worrell et al., 2021; Park, 2021).

Cultural values are evident in emphases on diligence, discipline, collective achievement, and national responsibility. Education is widely construed not only as personal development but also as a pathway to societal progress and economic growth. This value frame legitimizes intensive support under high expectations and sustains performance-focused evaluation. Accordingly, gifted education becomes a site where universal academic aims intersect with strong national development narratives (OECD, 2023; UNESCO, 2021).

Overall, South Korea illustrates both the strengths and limitations of a competition- and excellence-oriented model. Early identification and intensive STEM specialization can yield strong outcomes in international achievement, while the relative marginalization of socio-emotional dimensions invites critical scrutiny. In comparison with Germany and Finland, the South Korean case clarifies how cultural priorities shape the purposes and practices of gifted education in distinct ways.

Findings

This section synthesizes findings from the Germany, Finland, and South Korea cases within a cross-cultural comparative framework. The analyses illuminate not only structural and pedagogical differences in gifted education but also the cultural meaning systems that underpin these practices. Accordingly, the comparative findings make

visible how giftedness is defined, linked to particular values, and translated into educational policies across contexts. Gifted education is thus examined not as a singular universal construct but as a dynamic phenomenon shaped by culturally specific interpretations and priorities (Sternberg, 2021; Phillipson, 2023).

Meanings Attributed to Giftedness

Academic achievement, potential, or social responsibility?

Cross-cultural evidence indicates that the meanings attributed to giftedness vary substantially in line with national educational philosophies, societal values, and development priorities. Taken together, the three cases suggest that giftedness tends to be framed primarily in terms of academic achievement in Germany, developmental potential and holistic growth in Finland, and social/national responsibility in South Korea. This variation underscores that gifted education is not merely a pedagogical matter but also a cultural and ideological process of construction (Sternberg, 2021; Phillipson, 2023).

In Germany, giftedness is closely associated with high cognitive performance and measurable academic achievement. Early identification, selective school pathways, and domain-specific deepening practices signal an orientation toward defining giftedness through demonstrable performance and cultivating it via specialization. From this perspective, giftedness is treated as a capacity to be differentiated early and developed through academically rigorous trajectories,

foregrounding individual excellence and disciplinary expertise (Ziegler et al., 2021; Subotnik et al., 2019).

Finland, by contrast, frames giftedness less as early-demonstrated achievement and more as potential that can unfold over time in supportive learning environments. Rather than prioritizing labeling and selection, the Finnish approach emphasizes pedagogical supports and differentiated instruction within inclusive settings. Giftedness is thereby linked to the quality of learning processes and student well-being, positioning advanced development within a broader commitment to holistic education (Tirri & Kuusisto, 2020; OECD, 2024).

In South Korea, giftedness is strongly connected to social and national responsibility, particularly through a STEM-oriented excellence agenda. Gifted learners are often positioned as strategic human capital expected to contribute to national competitiveness and development. Academic excellence is therefore framed not only as individual accomplishment but also as a collective resource, supported through high expectations, discipline, and competitive environments (Park, 2021; Kim & Lee, 2022).

Overall, the comparison demonstrates that giftedness is not a single-dimensional construct: "achievement," "potential," and "responsibility" receive different weights across cultural contexts. Germany privileges academic excellence, Finland prioritizes developmental potential and ethical-holistic growth, and South Korea emphasizes national contribution through performance and excellence. These findings support the need to conceptualize gifted education through culturally responsive, multidimensional frameworks rather than

through universal definitions (OECD, 2023; Sternberg, 2021).

Comparing Identification and Selection Approaches

The cases also reveal pronounced cross-national differences in how gifted learners are identified and selected. Germany, Finland, and South Korea exemplify identification approaches structured, respectively, around selective psychometric assessment, pedagogical-developmental judgment, and competitive performance-based selection. These differences reflect not only variation in tools but also distinct underlying assumptions about the nature of giftedness itself (Dai, 2020; Peters et al., 2022).

In Germany, identification and selection commonly rely on standardized intelligence testing, academic achievement indicators, and teacher nominations, often coupled with early tracking into differentiated school pathways. This approach rests on the assumption that giftedness can be reliably measured at an early stage and matched with appropriate educational settings. Yet, its selective structure may advantage students with greater socioeconomic and cultural capital and may risk overlooking later-emerging potential (Ziegler et al., 2021; Worrell et al., 2021).

Finland, in contrast, deliberately distances itself from selection and separation logics. Identification is typically grounded in sustained teacher observation, classroom learning processes, and individual progress over time. Rather than treating identification as a one-time decision, it is embedded within ongoing pedagogical support. This aligns with an inclusive view of giftedness as a capacity

that can develop through appropriate learning conditions, thus aiming to reduce inequalities linked to socioeconomic and cultural differences (Tirri & Kuusisto, 2020; OECD, 2024).

South Korea's identification and selection processes are more explicitly competitive and performance-driven. Standardized examinations, academic records, and selective entry mechanisms play a central role, particularly in STEM-oriented pathways that encourage early specialization and high achievement. While this approach aligns with national development goals by positioning gifted learners as strategic human capital, it can also intensify test pressure and psychological burdens for students (Park, 2021; Kim & Lee, 2022).

In sum, these approaches are not merely technical procedures but are closely tied to cultural values and educational philosophies. Early selective identification in Germany reflects commitments to academic excellence and institutional differentiation; Finland's pedagogically embedded identification aligns with equity and developmental potential; and South Korea's performance-based selection resonates with collective achievement and national success agendas. Together, the findings highlight the difficulty of proposing a universal identification model and reinforce the need for context-sensitive approaches in gifted education (Subotnik et al., 2019; Phillipson, 2023).

Comparing Program Structures and Pedagogical Priorities

Comparative analysis of Germany, Finland, and South Korea demonstrates that program structures and

pedagogical priorities in gifted education are closely aligned with national education systems and cultural values. While Germany emphasizes institutional differentiation and selectivity, Finland prioritizes inclusive differentiation and teacher autonomy, and South Korea foregrounds performance-driven, STEM-centered acceleration and specialization. These contrasts indicate that responses to the questions of *for whom*, *for what purposes*, and *through which pedagogical means* gifted education is organized vary substantially across cultural contexts (Phillipson, 2023; OECD, 2024).

In Germany, program structures largely reflect the system's selective logic, relying on differentiated school types—particularly Gymnasium—and institutional specialization. Enrichment initiatives, domain-specific deepening, university partnerships, and mentoring aim to foster academic specialization. Pedagogical priorities focus on advanced cognitive tasks, disciplinary depth, and high academic performance, reinforcing the assumption that giftedness should be identified early and cultivated through intensified academic pathways (Ziegler & Stoeger, 2019; Olszewski-Kubilius et al., 2021).

Finland, by contrast, embeds gifted education within the general system through differentiated instruction and individualized support rather than separate tracks. High levels of teacher autonomy enable adaptation to students' interests, pace, and learning profiles. Project-based learning, interdisciplinary approaches, and enrichment activities support advanced learners in inclusive settings. Pedagogical priorities extend beyond academic outcomes to include student well-being and ethical development,

distinguishing the Finnish model from more selective approaches (Sahlberg, 2021; Tirri & Kuusisto, 2020).

South Korea adopts a more selective and intensified structure through specialized schools, science high schools, and nationally organized gifted programs. Advanced STEM curricula, accelerated coursework, research-based tasks, and competition-oriented preparation dominate program design. Pedagogical priorities center on measurable performance, high standards, and competitive achievement. While aligned with national development goals, this model has been criticized for marginalizing socio-emotional needs in favor of academic excellence (Kim & Lee, 2022; Park, 2021).

Overall, the comparison suggests that no single "best practice" model exists. Germany and South Korea share selective and academically intensified orientations, whereas Finland emphasizes inclusive differentiation and developmental support. Although all three systems aim to nurture high potential, they employ distinct pedagogical pathways shaped by cultural values. These findings underscore the necessity of culturally responsive program design that integrates pedagogical priorities with value systems (Subotnik et al., 2019; UNESCO, 2021).

Comparing Values, Implicit Messages, and Cultural Transmission

The three cases illustrate that gifted education is shaped not only by explicit goals and outcomes but also by implicit messages and value transmission. Program documents, pedagogical practices, and assessment procedures convey normative assumptions about success,

individuality, society, and the purpose of learning, all of which are culturally embedded. Accordingly, cross-cultural analysis must consider not only *what* is taught but also *what kinds of learners and citizens* are implicitly promoted (Apple, 2019; UNESCO, 2021).

In Germany, value transmission centers on disciplinary specialization, performance standards, and individual academic responsibility. Selective pathways and differentiated school types reinforce early differentiation and merit-based progression, implicitly framing success in terms of measurable academic outcomes. Gifted education thus legitimizes academic excellence and specialization as culturally valued virtues (Ziegler et al., 2021; OECD, 2024).

Finland's implicit messages emphasize equity, trust, and student well-being. Limited reliance on selective mechanisms prevents giftedness from becoming a marker of privilege and supports an inclusive orientation focused on developmental potential. Teacher autonomy and differentiated instruction promote learning as a meaningful process rather than a competitive endeavor, foregrounding ethical responsibility and social cohesion (Tirri & Kuusisto, 2020; Sahlberg, 2021).

In South Korea, value transmission is strongly associated with diligence, discipline, collective achievement, and contribution to national development. Performance-based selection and STEM-focused programs communicate that academic success serves broader societal goals. While this framing can be highly motivating, it also generates intense competition and exam pressure, producing psychosocial risks alongside high achievement (Park, 2021; Kim & Lee, 2022).

Comparatively, values and implicit messages function not as background features but as structuring elements of program design. Selectivity and specialization in Germany, inclusivity and well-being in Finland, and competition and national responsibility in South Korea shape gifted learners' educational experiences in fundamentally different ways. These findings highlight the ethical significance of value transmission in gifted education and the need to evaluate programs in terms of their cultural and normative consequences (Phillipson, 2023; Subotnik et al., 2019).

Taken together, the comparative findings demonstrate that gifted education should be assessed not only by effectiveness but also by the values it amplifies and the learner profiles it privileges. Systematic attention to implicit messages provides a strong evidentiary basis for culturally responsive program design and supports the development of more balanced, ethically grounded approaches that integrate universal educational aims with local values (UNESCO, 2021; OECD, 2023).

Discussion and Conclusion

The cross-cultural case analyses of Germany, Finland, and South Korea demonstrate that gifted education cannot be adequately explained through a single universal model. Definitions of giftedness, identification practices, and educational provisions are shaped by specific historical, cultural, and political contexts. In this sense, the study challenges dominant universalist models and advances a context-sensitive comparative perspective on gifted education (Phillipson, 2023; Sternberg, 2021).

At the theoretical level, the findings reveal the limitations of viewing giftedness as a unidimensional cognitive capacity. Giftedness is constructed as academic specialization in Germany, developmental potential and holistic growth in Finland, and a strategic resource linked to national development in South Korea. This variation underscores the need for theories of giftedness that explicitly incorporate cultural and ideological dimensions (Dai, 2020; Subotnik et al., 2019).

Differences in identification and program structures further illustrate how these theoretical orientations are operationalized in practice. Germany and South Korea emphasize early, performance-based selection and differentiated institutional arrangements, whereas Finland adopts an inclusive, pedagogically driven approach. These contrasts highlight that gifted education involves not only curricular intensity but also the broader organization and meaning of learning experiences (Olszewski-Kubilius et al., 2021; Sahlberg, 2021).

A key issue emerging from the findings concerns the balance between academic excellence and socio-emotional development. Strong academic prioritization in Germany and South Korea may generate risks related to student well-being, while Finland offers protective ethical and pedagogical mechanisms alongside challenges in systematically supporting exceptional potential. Together, these patterns suggest that one-dimensional conceptions of success are insufficient in gifted education (Tirri & Kuusisto, 2020; Worrell et al., 2021).

The analysis also reveals gifted education as a site of cultural transmission, reflecting normative values such as specialization and individual responsibility in Germany,

equity and trust in Finland, and competition and collective achievement in South Korea. From a policy perspective, the findings caution against direct model transfer and instead emphasize the need to reinterpret identification criteria and program designs in alignment with local contexts (Apple, 2019; Steiner-Khamsi, 2020).

Overall, this study shows that cross-cultural case analysis provides a strong framework for both theoretical refinement and policy development in gifted education. Rather than seeking a singular "best model," gifted education should be guided by questions of context, values, and educational purposes, supporting culturally responsive, ethically grounded, and holistic approaches to nurturing gifted learners (OECD, 2024; UNESCO, 2021).

Theoretical Contributions and Practical Implications

Theoretical Contributions

A cross-cultural perspective on giftedness

A central theoretical contribution of this study is its cross-cultural reconceptualization of giftedness, which challenges universal and singular definitions dominant in the literature. The comparative analysis of Germany, Finland, and South Korea demonstrates that giftedness cannot be reduced to individual cognitive capacity alone, but is shaped by cultural values, educational philosophies, and societal priorities. This finding provides a critical foundation for rethinking normative and universalist frameworks in gifted education research.

In-depth analysis through case study methodology

A second contribution lies in the use of cross-cultural case study methodology as an analytical lens. By examining identification practices, program structures, and value transmission in an integrated manner, the study moves beyond surface-level comparison and offers a context-sensitive analysis. This approach makes implicit assumptions and cultural codes more visible, thereby enriching the methodological and conceptual tools available in gifted education research.

Practical Implications

For curriculum developers

The findings suggest that curricula based on uniform and universal models may yield limited outcomes for gifted learners. Curriculum development should therefore integrate academic depth and acceleration with socio-emotional development, ethical sensitivity, and social responsibility. Flexible curricular frameworks that align with local cultural values and systemic conditions are more likely to support gifted learners' potential in balanced and sustainable ways.

For teacher education and instructional practice

Teachers play a pivotal role in gifted education, underscoring the need for teacher education programs that emphasize culturally responsive pedagogy alongside differentiated instruction. Conceptualizing giftedness as a developmental and context-sensitive potential, rather than a fixed label, can foster more inclusive and ethically grounded classroom practices. Strengthening both pre-service and in-service teacher education emerges as a key area for implementation.

Directions for Future Research

Expanding cultural contexts

While this study focuses on three national contexts, gifted education encompasses far broader cultural diversity. Future research should extend to additional regions, including low- and middle-income countries and multicultural education systems, to deepen understanding of how giftedness is constructed and supported across diverse settings.

Longitudinal and mixed-methods designs

Further research would also benefit from longitudinal and mixed-methods designs. Longitudinal studies can illuminate the long-term effects of identification and program practices, while mixed-methods approaches enable more nuanced analysis of the relationships among cultural context, individual experience, and measurable outcomes. Together, these designs can provide stronger empirical foundations for theory and practice in gifted education.

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CHAPTER 11

IDENTIFICATION, ASSESSMENT, AND MONITORING OF GIFTED STUDENTS IN INCLUSIVE EDUCATION

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Introduction

One of the fundamental objectives of educational systems is to create learning environments that enable every student to realize their individual potential to the fullest extent. This objective requires the recognition and understanding of students' diverse characteristics and needs, along with the planning of appropriate educational interventions accordingly. The inclusive education approach, internationally recognized through the Salamanca Statement in 1994, emphasizes that all children have the right to access quality education regardless of their physical, intellectual, social, emotional, or linguistic characteristics (UNESCO, 1994). This perspective represents a holistic approach that encompasses not only disadvantaged or disabled students but also gifted students.

Gifted students are defined as individuals who demonstrate extraordinary performance in one or more areas compared to their peers or possess such potential. According to Renzulli's (1978) three-ring model, giftedness is a dynamic concept that emerges at the intersection of above-average ability, creativity, and task commitment. Gagné (2009), in his Differentiated Model of Giftedness and Talent (DMGT), draws attention to the distinction between natural abilities and systematically developed performance, emphasizing the role of environmental and personal catalysts in this transformation. Both theoretical frameworks demonstrate that giftedness is not a fixed trait but rather a potential that can be developed through appropriate educational interventions.

The education of gifted students within the context of inclusive education extends beyond enrichment and acceleration programs traditionally offered in separate settings, requiring the adoption of differentiated instruction practices within general education classrooms (Marsili et al., 2023). This situation necessitates that teachers accurately identify gifted students, utilize appropriate assessment tools, and systematically monitor student development. However, research indicates that teachers' competencies in this area generally remain at moderate levels and that various challenges are experienced in identifying gifted students (Çalışkan & Baloglu, 2023).

In Türkiye, the education of gifted students is predominantly conducted through Science and Art Centers (BİLSEM). These centers provide supplementary education parallel to formal schooling and implement a multi-stage assessment model in the identification process (MEB, 2015). However, in accordance with inclusive education principles, the needs of gifted students must be addressed not only in specialized centers but also in general education settings. This chapter addresses the theoretical foundations, current practices, and recommendations for the identification, assessment, and monitoring of gifted students within the framework of inclusive education.

Conceptual Framework

The identification, assessment, and monitoring of gifted students in the context of inclusive education necessitates a multidimensional and developmental perspective. Considering giftedness not merely as an individual characteristic but as a dynamic potential emerging from

the interaction between the individual and their environment directly influences the quality of educational practices. Therefore, the inclusive education approach adopts the recognition, support, and reflection of differences in educational processes as a fundamental principle for gifted students, as it does for all students.

The theoretical approaches addressed in this chapter present different perspectives on the definition of giftedness while providing a framework for how identification, assessment, and monitoring processes can be structured in accordance with inclusive education principles. This conceptual foundation constitutes a reference point supporting the understanding of practices and assessment approaches discussed in subsequent sections.

Inclusive Education and Giftedness

Inclusive education is defined as a process that responds to the diverse needs of all students, ensures their full participation in the educational system, and aims to eliminate discrimination (UNESCO, 2020). This approach envisions schools being structured according to students' needs rather than students adapting to schools. The principle of "adapting curricula to children's needs rather than children to curricula," emphasized in the Salamanca Statement (UNESCO, 1994), forms the philosophical foundation of inclusive education.

The position of gifted students within inclusive education has been examined with increasing interest in recent years. Baccassino and Pinnelli's (2023) systematic review revealed that research on the academic, social, and personal outcomes of gifted students in inclusive settings

is not yet at sufficient levels. Marsili and colleagues (2023) found that while gifted students' peer collaboration and social interaction skills develop in inclusive classrooms, instructional inadequacies can lead to loss of motivation. These findings indicate that inclusive education presents both opportunities and challenges for gifted students.

Tirri and Laine (2017) discussed the ethical dimensions of educating gifted students in inclusive education, arguing that ignoring the needs of these students constitutes a form of educational neglect. The inclusive education approach adopts an equity-based approach beyond the concept of equality. As Aristotle emphasized in the Nicomachean Ethics, "what is just and what is equal are the same thing, and while both are good, what is equal is best." From this perspective, while providing gifted students with the same curriculum as other students may appear consistent with the principle of equality, failure to meet individual needs contradicts the principle of equity.

Theoretical Models of Giftedness

The definition and conceptualization of giftedness has long been a debated topic in the literature. Traditional approaches based on single-dimensional intelligence tests have been replaced by multidimensional and developmental models. This change directly affects identification processes and educational interventions.

Renzulli's (1978, 2005) three-ring model addresses giftedness as the interaction of three components: above-average ability, creativity, and task commitment. The model reveals that giftedness is not a static characteristic by emphasizing that gifted behavior emerges in certain

individuals, at certain times, and under certain conditions. Renzulli divided above-average abilities into general abilities (information processing, integrating experiences, abstract thinking) and specific abilities (capacity to acquire knowledge in a particular field). The creativity dimension refers to fluency, flexibility, and originality in thinking, while task commitment represents the transformation of motivation into action.

Gagné's (2009, 2020) Differentiated Model of Giftedness and Talent (DMGT) makes a clear distinction between giftedness and talent concepts. According to this model, giftedness refers to natural abilities that emerge untrained and spontaneously in one or more developmental domains (intellectual, creative, socio-emotional, sensory-motor). Talent, on the other hand, defines the transformation of these natural capacities into outstanding performance in a specific field through systematic learning and practice processes. The DMGT model emphasizes that environmental catalysts (family, school, community) and personal catalysts (motivation, self-regulation, personality) play critical roles in this transformation process.

Sternberg (2022, 2023) argues that giftedness should be defined not as a fixed trait within the individual but in the social context and through the utilization of abilities. This perspective indicates that identification processes should assess not only potential but also how abilities are used and developed. In the context of inclusive education, this approach is significant for teachers to observe gifted behaviors in the classroom and provide appropriate opportunities.

Conceptual Foundations and Practices of Identification

The identification of gifted students is a multidimensional process aimed at early recognition of individual potential and planning of appropriate educational arrangements. Current approaches do not consider identification based on a single measurement tool sufficient; they recommend the combined use of multiple data sources covering cognitive, academic, creative, and socio-emotional domains. Accordingly, identification is addressed not merely as a selection and separation process but as a continuous assessment process aimed at identifying students' strengths and supporting their development.

In practice, identification processes require the holistic use of methods such as teacher observations, standardized tests, nominations, performance-based assessments, and portfolio work. In inclusive education settings, it is important that these processes are conducted flexibly, with cultural sensitivity, and based on the principle of equity. An effective identification process provides a fundamental basis for gifted students to continue their learning with appropriate support in general education settings.

Fundamental Principles in Identification

The identification of gifted students is a complex and ongoing area of debate due to its multidimensional nature. Worrell and Erwin (2011) emphasized that assessment and identification in gifted education should be clear, structured, and multifaceted. The effectiveness of the identification process depends on the scientific validity

and reliability of the methods used, cultural sensitivity, and inclusiveness of different student profiles.

The identification principles established by the Ministry of National Education (2010) set forth the fundamental principles to be observed in this process: prioritizing the individual's best interests, ensuring that methods used are scientific, objective, and impartial, conducting identification at early ages, ensuring equal opportunity, conducting systematic assessment at every age and grade level, ensuring alignment of measurement tools with program objectives, and having guidance decisions made by an interdisciplinary team. These principles maintain their validity in the context of inclusive education and guide identification processes in general education classrooms.

Mossberg, Lundqvist, and Sund (2024) identified five key factors in their international scoping review focused on early identification and inclusive education: knowledge of giftedness, providing all children opportunities to demonstrate their abilities, identification strategies, stakeholder collaborations, and teacher education and professional development. Each of these factors is critically important for identifying gifted students in inclusive settings.

Identification Tools and Methods

The tools used in identifying gifted students can be categorized as ability tests, achievement tests, creativity tests, nominations, and portfolio assessment. Each type of tool has its strengths and limitations, and a multiple assessment approach rather than the use of a single tool is recommended (Pfeiffer, 2012; Saadu et al., 2024).

Ability tests are standardized tools designed to measure an individual's intellectual capacity. In Türkiye, the Raven Progressive Matrices Test is commonly used for group screening in the BİLSEM identification process, while the Wechsler Intelligence Scale for Children (WISC-R) is widely used for individual assessment (Kurnaz & Ekici, 2020). While these tests are effective in assessing non-verbal intellectual abilities, they do not cover creativity, leadership, and specific talent areas. Peters (2022) emphasized that one of the main barriers to achieving equity in gifted education is that traditional identification tools do not adequately represent culturally and socioeconomically diverse student groups.

The nomination process involves identifying students thought to be gifted based on observations from teachers and parents. In Türkiye, classroom teachers play a critical role in the initial stage of the BİLSEM identification process. However, research reveals that teachers experience various difficulties in the nomination process. Akar and Uluman (2013) found that classroom teachers' rates of accurately nominating gifted students were low. Erol, Gedik, and Demirtaş (2023) determined that teachers experience uncertainties in recognizing gifted student characteristics and completing nomination forms.

In inclusive education settings, identification should not be limited to formal assessment processes alone. Teachers' classroom observations, activities students prefer during free time, problem-solving approaches, and interaction patterns with peers can be indicators of giftedness. Freeman, Raffan, and Warwick (2010) emphasized that identification methods should vary according to the targeted purpose and student profile. For

example, the characteristics of students expected to achieve academically will differ from students talented in sports.

The Identification System in Türkiye and BİLSEM Practices

The identification of gifted students in Türkiye is structured as a multi-stage process. This process, conducted within the framework of the Science and Art Centers Regulation, consists of nomination, group screening, and individual examination stages (MEB, 2015). Through observation forms sent to schools in October of each academic year, teachers nominate students they believe to be gifted. At each school, up to twenty percent of students at 1st, 2nd, and 3rd grade levels can be nominated for each talent area.

Nominated students undergo group screening at Guidance and Research Centers. At this stage, the Basic Abilities Test (Form 7-11) is administered. Students who demonstrate sufficient performance in group screening are referred for individual examination and assessed through the Wechsler Intelligence Test. Assessment results are sent to the MEB General Directorate of Special Education, Guidance and Counseling Services, and approved students gain the right to register at BİLSEM.

This system serves an important function in identifying gifted students and directing them to special education services. However, from an inclusive education perspective, certain limitations are notable. First, the identification process predominantly focuses on intellectual abilities, with creativity, leadership, and specific talent areas not being adequately assessed.

Second, the exclusion of students identified as gifted from any differentiation or enrichment practices in general education classrooms contradicts inclusive education principles. Çitil (2018), in his study evaluating gifted education policies in Türkiye, drew attention to these limitations and emphasized that the system needs to be restructured with a holistic approach.

Assessment Approaches in Inclusive Education

Assessment in inclusive education settings is based on a holistic understanding that aims to reveal not only students' academic achievements but also their learning processes, individual progress, and strengths. For gifted students, this process requires moving beyond traditional assessments focused on standard grade levels and adopting flexible approaches that do not limit students' potential. In this context, assessment is considered as a tool that supports learning and guides instruction.

The combined use of formative, summative, and performance-based assessment approaches is important in inclusive education. Formative assessment allows for monitoring student development during the instructional process and providing timely feedback, while performance-based and authentic assessments support gifted students in demonstrating their higher-order thinking, problem-solving, and creativity skills. The integrated application of these approaches contributes to the healthy monitoring of both academic and individual development of gifted students in inclusive education settings.

Multi-Tiered Support Systems and Gifted Students

Multi-Tiered Support Systems (MTSS) and Response to Intervention (RTI) models are data-driven frameworks designed to address the academic, social, and behavioral needs of all students (Center on RTI, 2014). These systems include universal screening, tiered interventions, and progress monitoring components. While traditionally developed for students experiencing academic difficulties, these models also provide an effective framework for meeting the needs of gifted students.

Coleman and Hughes (2009) discussed how gifted education can be structured within the RTI framework and emphasized that the basic components of this model are also applicable to gifted students. The tiered support approach, early intervention, dynamic assessments, and collaborative problem-solving emerge as effective strategies for identifying and meeting the needs of gifted students in inclusive settings. In this model, strengths-based tiered interventions are planned for gifted students, and student development is systematically monitored.

In the MTSS model, the first tier encompasses core instruction of universal quality for all students. For gifted students, curriculum compacting and differentiated instruction practices come into play at this tier. The second tier includes targeted small group interventions when first-tier interventions are insufficient. Enrichment groups, advanced content studies, and mentor programs can be implemented for gifted students at this tier. The third tier encompasses intensive individual interventions, where acceleration, radical acceleration, or advanced individual projects are situated for exceptionally gifted students.

Formative and Summative Assessment

The assessment of gifted students in inclusive education settings requires both formative and summative assessment approaches. Formative assessment is used to monitor student learning and provide feedback during the instructional process. This type of assessment is critically important for determining the current levels of gifted students, individualizing instruction, and providing timely intervention.

Effective use of formative assessment for gifted students requires prevention of the ceiling effect. Standard assessments targeting grade level may be insufficient to reveal the actual performance levels of gifted students. Therefore, the use of off-grade level assessment tools is recommended (Staus et al., 2021). Through pre-assessments, identifying knowledge and skills that students have previously acquired constitutes a fundamental data source for curriculum compacting decisions.

Summative assessment is administered at the end of the learning period to determine student outcomes. For gifted students, in addition to standard achievement tests, alternative approaches such as performance-based assessments, portfolio assessment, and authentic product assessment can be used in summative assessment. Such assessments allow students to demonstrate their creativity, critical thinking skills, and problem-solving strategies.

Authentic and Performance-Based Assessment

Authentic assessment approaches are increasingly gaining importance in the assessment of gifted students. Authentic assessment encompasses tasks that require students to apply their knowledge and skills in real-life contexts. This approach is effective in assessing higher-order thinking skills, creativity, and problem-solving capacity that standard tests cannot measure.

Within the framework of Renzulli's (1982, 1994) Enrichment Triad Model, gifted students engage in processes of exploring real problems and developing authentic products. The assessment of these processes requires different criteria than traditional test approaches. Tools such as product assessment rubrics, evaluation of student presentations, peer assessment, and self-assessment constitute components of the authentic assessment process.

Portfolio assessment is an effective tool for documenting and monitoring the development of gifted students. Student portfolios include work produced over time, learning reflections, and evidence of development. This approach encourages students to reflect on their own learning processes and provides teachers with comprehensive data for individualized instructional planning.

Progress Monitoring and Development Assessment

Progress monitoring is a data-based approach aimed at regular and systematic assessment of students' development in their learning processes. For gifted students in the context of inclusive education, progress

monitoring encompasses not only determining current performance but also tracking the extent to which individual potential is being developed. This process allows for the evaluation of instructional practices' effectiveness and restructuring of interventions when necessary.

In development assessment, it is important to use individualized goal-based assessment approaches alongside standard criteria. Student-specific progress indicators support a holistic approach to the academic, cognitive, and socio-emotional development of gifted students. Regular progress monitoring is considered a fundamental tool for providing responsive and sustainable support to student needs in inclusive education settings.

Conceptual Foundations of Progress Monitoring

Progress monitoring is a method used to regularly assess students' academic performance and determine the effectiveness of instruction (Fuchs & Fuchs, 2007). This process constitutes one of the basic components of the MTSS framework and supports data-driven decision-making processes. Progress monitoring enables the assessment of students' responses to interventions, determination of instructional strategies' effectiveness, and restructuring of interventions when necessary.

Progress monitoring for gifted students requires some specific considerations. Traditional progress monitoring tools are typically structured according to grade-level standards. For gifted students, these tools may be insufficient and may not adequately reflect student development. Therefore, specialized progress monitoring

systems targeting gifted students' individual goals and advanced outcomes should be developed.

Coil (2011) developed progress monitoring forms for gifted students and emphasized that these forms can be used in various areas such as curriculum compacting, problem-solving, tiered lessons, motivation, organizational skills, and classroom behavior. These forms include teacher observations, checklists, rating scales, and performance assessments, and are effective in monitoring behaviors and skills that cannot be assessed by test scores alone.

Frequency and Methods in Progress Monitoring

The frequency of progress monitoring is determined according to intervention intensity and student needs. Research has shown that weekly monitoring does not provide a significant advantage over monthly monitoring, but monitoring should be conducted at least once a month (Fuchs et al., 1989; Johnson et al., in press). For gifted students, twice-monthly progress monitoring is recommended for second-tier supports, and weekly monitoring for third-tier supports (Branching Minds, 2023). These frequencies allow for timely identification of changes in student performance and restructuring of interventions when necessary.

The methods used in progress monitoring vary according to the construct being measured and student characteristics. Curriculum-based measurement (CBM) tools are commonly used for monitoring academic skills. These tools measure student performance through brief, standardized assessments and visualize development trends through graphical representations. For gifted

students, CBM tools should be adapted to target skills above grade level.

Progress monitoring in non-academic areas is conducted through observation protocols, rating scales, and performance indicators. The socio-emotional development of gifted students, motivation levels, creativity indicators, and leadership skills can be monitored using such tools. Monitoring development in these areas in the context of inclusive education is critically important for supporting students' holistic well-being.

Data-Driven Decision Making

Effective use of progress monitoring data requires data-driven decision-making processes. This process encompasses systematic collection, analysis, and interpretation of data. When teachers have access to data systems, the likelihood of sharing data with families, monitoring student progress, and planning and improving instruction increases (U.S. Department of Education, 2007).

MTSS data systems should fulfill functions of access to data at the individual student level, documentation of instructional decisions, graphical representation of data, and determination and evaluation of goals at school, classroom, and individual levels (Center on RTI, 2014). For gifted students, these systems enable monitoring of individual development goals, evaluation of the effectiveness of enrichment and acceleration interventions, and adjustment of intervention levels when necessary.

Decision rules include predefined criteria for determining students' risk status, risk verification, and application decisions for specific groups. For gifted students, decision rules should be structured according to the student's current performance level, targeted outcomes, and rate of progress. For example, for a student who does not demonstrate expected progress within a specified period, a decision may be made to increase intervention intensity or try a different strategy.

Inclusive Education Practices and Teacher Competencies

The effective support of gifted students in inclusive education settings is directly dependent on the flexibility of instructional practices and teachers' professional competencies in this area. In this context, inclusive education requires not only physical presence in the same environment but also the differentiation and support of instructional processes according to students' individual characteristics. Inclusive practices for gifted students focus on enriched learning experiences, instruction at appropriate pace and depth, and revealing individual potential.

In this process, teachers' knowledge of giftedness, differentiated instruction skills, assessment literacy, and capacity for collaboration with stakeholders play a determining role. Effective inclusive practices are not limited to individual teacher efforts but are supported by school-based teamwork and family involvement. Therefore, meeting the needs of gifted students in inclusive education necessitates a holistic and multi-stakeholder approach.

Differentiated Instruction

Meeting the needs of gifted students in inclusive education settings requires differentiated instruction practices. Differentiated instruction involves adapting content, process, product, and learning environment according to students' readiness levels, interests, and learning profiles (Tomlinson, 2001). Differentiation for gifted students can take the form of more complex content, faster instructional pace, more authentic product expectations, and more autonomous learning environments.

Curriculum compacting is an effective differentiation strategy for gifted students. This strategy involves identifying knowledge and skills that students have previously acquired, reducing instructional time on these topics, and using the gained time for enrichment or acceleration activities (Renzulli et al., 1982). Research shows that curriculum compacting increases the motivation and engagement of gifted students.

Enrichment activities for gifted students in inclusive classrooms encompass content expansion in depth and complexity dimensions. Kaplan's (2009) depth and complexity model offers strategies for exploring disciplines' fundamental concepts, patterns, trends, ethical dimensions, and interdisciplinary connections. Such activities go beyond the standard curriculum to develop students' critical thinking and creative problem-solving skills.

Teacher Competencies and Professional Development

Meeting the needs of gifted students in inclusive education is directly dependent on teachers' knowledge and skills in this area. Research reveals that teachers' self-efficacy levels regarding gifted education are generally at moderate levels (Çalışkan & Baloglu, 2023). It has been determined that teachers with experience with gifted students have higher self-efficacy levels, and this finding emphasizes the importance of professional development programs.

Gümüş Gürler, Şahin, and Akdal (2023) found that training provided to teachers on identifying gifted students significantly increased teachers' knowledge levels. Similarly, Eker (2020) demonstrated that teacher education programs are effective in developing professional competencies in gifted education. These findings indicate the potential of systematic professional development programs to improve identification and instructional quality.

Teacher competencies in inclusive education encompass dimensions of knowledge of giftedness, identification skills, differentiated instruction capacity, assessment literacy, and collaboration skills. The development of these competencies should be addressed both in pre-service teacher education programs and in-service professional development activities. Particularly, strengthening the capacity of teachers working in general education classrooms outside BİLSEM in this area is critically important for the effectiveness of inclusive education.

Collaborative Approaches

Meeting the needs of gifted students in inclusive education requires multi-stakeholder collaboration processes. Effective communication and coordination among classroom teachers, special education specialists, guidance and psychological counselors, administrators, and families form the foundation of successful practices. School guidance committees play a critical role in the BİLSEM identification process; however, in the context of inclusive education, the function of these committees should not be limited to nomination alone but should also encompass planning and monitoring of supports in general education classrooms.

Family involvement is an important component in the education of gifted students. Understanding parents' expectations, experiences, and concerns forms the foundation for developing effective school-family collaboration. Dilber (2024) examined the expectations and experiences of parents participating in the BİLSEM identification process and determined that parents were not adequately informed about the process. In the context of inclusive education, active participation of parents in both the identification process and support programs in general education classrooms should be encouraged.

Discussion

The findings and theoretical approaches addressed in this chapter demonstrate that the education of gifted students within the framework of inclusive education has a multi-layered and dynamic structure. Considering giftedness as a potential that develops under appropriate environmental conditions and educational interventions rather than a

fixed individual characteristic aligns with current approaches in the literature. Renzulli's emphasis on gifted behavior and Gagné's natural ability-talent distinction explain why the identification, assessment, and monitoring processes addressed in this study need to be approached with a holistic understanding.

The findings regarding identification processes in the context of inclusive education parallel the requirement for multiple assessment frequently emphasized in international literature. Criticisms that single-dimensional test-based approaches cannot adequately reflect cultural and socioeconomic differences align with the studies presented in this chapter. While the BİLSEM-focused identification system in Türkiye provides a strong institutional structure, the insufficient visibility of gifted students in general education classrooms constitutes an important area of discussion in terms of inclusive education principles. This situation indicates that identification needs to be reconsidered not merely as a selective mechanism but as a continuous process supporting educational planning.

Discussions regarding assessment approaches reveal the importance of equity-based practices rather than equality in inclusive education. The prominence of formative and authentic assessment approaches allows for a deeper understanding of gifted students' learning processes. However, as noted in the literature, assessments focused on standard grade level can create ceiling effects for gifted students and prevent actual performance from being visible. In this context, the use of off-grade level assessment tools can be considered not only a

pedagogical preference but also an ethical requirement of inclusive education.

Findings regarding progress monitoring and data-driven decision-making processes indicate that multi-tiered support systems also provide a functional framework for gifted students. However, the traditional structuring of these models based on students experiencing academic difficulties brings about the need for adaptation for gifted students. Progress monitoring practices based on specialized goals enable more accurate tracking of these students' development rates and learning patterns. This situation presents an important area of discussion regarding the balance between standardized practices and individualized supports in inclusive education.

Discussions regarding teacher competencies and inclusive practices once again reveal the teacher's central role in inclusive education. The limited knowledge and self-efficacy levels of teachers regarding giftedness should be considered not merely an individual deficiency but a structural problem of pre-service and in-service education systems. In this context, supporting gifted students in inclusive education requires planned professional development policies at the school-based and system levels beyond individual teacher efforts.

Finally, findings regarding collaboration between family and school indicate that inclusive education cannot be limited to practices within the school alone. Parents' lack of knowledge about identification and support processes can negatively affect both students' access to educational opportunities and the transparency of the process. This situation reveals that the communication and

collaboration dimension among stakeholders in the inclusive education approach needs to be strengthened.

When these discussions are evaluated holistically, it is understood that the education of gifted students in inclusive education needs to be addressed within the interaction of theoretical models, identification practices, assessment approaches, teacher competencies, and stakeholder collaborations. This framework strengthens the theoretical and practical foundation on which the conclusions and recommendations presented in the following section are based.

Conclusion and Recommendations

The inclusive education approach is fundamentally based on recognizing the individual differences of all students, including gifted students, and creating educational environments sensitive to these differences. In this chapter, the theoretical foundations and current practices regarding the identification, assessment, and monitoring of gifted students within the framework of inclusive education have been addressed from a holistic perspective. The findings reveal that giftedness is a dynamic potential that can be developed under appropriate educational conditions rather than a fixed characteristic.

The effectiveness of identification processes depends on adopting multidimensional, continuous, and culturally sensitive assessment models rather than approaches based on a single criterion or tool. While the identification system conducted through Science and Art Centers (BİLSEM) in Türkiye serves an important function, mechanisms that will ensure early recognition and

support of gifted students in general education classrooms need to be strengthened in accordance with inclusive education principles. In this context, teachers' roles and competencies in identification processes emerge as a determining factor.

The adoption of multi-tiered support systems in assessment processes provides an effective framework for monitoring the academic and individual development of gifted students. The integrated use of formative, summative, and authentic assessment approaches allows for the evaluation of not only students' current achievement levels but also their learning processes and developmental potential. In these processes, the use of off-grade level assessment tools and performance-based criteria is important for preventing ceiling effects.

Progress monitoring forms the foundation of data-driven decision-making processes and enables the evaluation of implemented educational interventions' effectiveness. The development of individualized goal-based progress monitoring systems for gifted students allows for flexible restructuring of instruction and timely response to student needs. Regular and systematic progress monitoring plays a critical role in providing sustainable and effective support in inclusive education settings.

In conclusion, the education of gifted students in inclusive education requires a systemic approach in which identification, assessment, and monitoring processes are addressed as a complementary whole. This approach necessitates strengthening teacher competencies, expanding differentiated instruction practices, and developing school-family-specialist collaboration. The holistic consideration of these

components will make significant contributions to creating quality and inclusive educational environments in which gifted students can realize their potential to the fullest extent.

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CHAPTER 12

GIFTED STUDENTS IN INCLUSIVE EDUCATION: ACADEMIC PERFORMANCE AND PARTICIPATION DYNAMICS IN SOCIAL STUDIES

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Introduction

Education systems are evolving toward inclusive approaches that aim to accommodate each student's individual differences and learning needs (Van Mieghem et al., 2020; Booth & Ainscow, 2016). Gifted students constitute a group requiring special support in both cognitive and socio-emotional development (Pfeiffer, 2012; Renzulli, 2021). In standard curricula, they are often under-stimulated, which may lead to decreased motivation, social adjustment issues, and fluctuations in academic performance (Reis & Renzulli, 2010; VanTassel-Baska & Little, 2021).
Social Studies is regarded as a core subject, fostering democratic awareness, social responsibility, critical thinking, and intercultural understanding (Banks, 2008; Wineburg, 2010). In inclusive classrooms, without tailored instructional strategies and individualized learning plans, participation and success of gifted students in these courses are not sufficiently effective (Stentiford & Koutsouris, 2021; Tomlinson, 2017).

Moreover, students' socio-emotional development, classroom interactions, and teachers' levels of awareness directly influence the success of inclusive education (Hébert, 2021; Neihart, 2021). Research indicates that inclusive practices positively affect gifted students' academic performance and motivation (Ardenlid et al., 2025; Subotnik et al., 2011). However, in practice, due to various challenges and barriers, this potential often remains unfulfilled (Dai & Chen, 2021; Dixon & Moon, 2021). Consequently, detailed studies on learning processes of gifted students in inclusive environments are necessary.

Purpose and Significance of the Study

Inclusive education is a contemporary educational approach that aims to ensure equal participation and learning for all students with diverse developmental characteristics within the same learning environment (Booth & Ainscow, 2016; Van Mieghem et al., 2020). However, in practice, the needs of gifted students are often not adequately addressed within this framework. These students frequently experience fluctuations in academic performance, reduced motivation, and social adjustment problems due to insufficient stimulation in standard curricula (Pfeiffer, 2012; Reis & Renzulli, 2010; Renzulli, 2021). In particular, in disciplines like Social Studies—where multidimensional skills such as critical thinking, social awareness, and democratic engagement are essential—the need for differentiated teaching strategies and structured participation opportunities for gifted students becomes even more apparent (Banks, 2008; Wineburg, 2010; Tomlinson, 2017).

Accordingly, the main objective of this study is to examine the academic achievement, classroom participation, and motivation levels of gifted middle school students in the context of inclusive education, specifically within Social Studies courses. In addition, the study investigates the effects of corrective actions implemented during action research cycles, observable changes in students' socio-emotional development, the reflection of achievement test results on the learning process, and students' feedback and recommendations regarding the inclusive education process. With this multifaceted approach, the research aims to contribute not

only to individual student success but also to the improvement of teaching strategies, the enhancement of the quality of inclusive practices, and the promotion of educational equity (Subotnik et al., 2011; Hébert, 2021; Ardenlid et al., 2025).

In the Turkish context, action research-based studies focusing on gifted students remain limited, which increases the originality and value of this research. By addressing both academic and socio-emotional development through empirical data, this study seeks to provide a holistic assessment of inclusive education practices for gifted learners. In doing so, it aims to support teachers, school administrators, and policymakers in developing solutions to challenges encountered in the implementation of inclusive education.

Research Questions

1. How does the academic performance of gifted students in Social Studies change?

How do inclusive education practices affect gifted students' participation and motivation in class?

2. What changes can be observed in the socio-emotional development of gifted students during the inclusive education process?

3. What are the effects of corrective actions applied during action research cycles on implementation outcomes?

4. How are achievement test results reflected in the learning processes of gifted students?

5. What are the feedback and recommendations of gifted students regarding the inclusive education process?

Main Research Problem

The main research problem of this study is that gifted students' academic achievement, classroom participation, motivation, and socio-emotional development in Social Studies are not being holistically supported within inclusive educational environments. Consequently, these students are unable to fully realize their potential, and current practices fall short in meeting their specific educational needs (Dai & Chen, 2021; Dixon & Moon, 2021; Neihart, 2021).

Theoretical Framework

The inclusive education approach is a comprehensive educational model that aims to ensure equal participation of all students, including those with learning difficulties, in shared learning environments, thereby promoting equity and justice in education (Aguis, 2024; Shyman, 2015). This approach necessitates the design of flexible, multidimensional, and multifaceted learning environments that consider student differences. Particularly, the inclusion of gifted students alongside peers with learning difficulties in the same classroom requires addressing diverse learning needs. The variety of these needs makes the implementation of individualized and differentiated instructional practices—one of the fundamental pillars of inclusive education—essential (Akintayo et al., 2024; Khattak et al., 2025).

Gifted students often stand out in the educational process due to their high cognitive and creative abilities. However, despite these advantages, if appropriate instructional strategies are not developed in inclusive classroom settings, these students may lack the necessary academic and social support (Tomlinson, 2017; VanTassel–Baska & Stambaugh, 2006). This situation can negatively affect both their academic success and socio-emotional development. Therefore, it is critical that inclusive education practices consider the unique needs of gifted students.

In this context, Social Studies emerges as an important educational field. Through various disciplines such as history, geography, citizenship, and cultural values, it provides opportunities for students to develop critical thinking, social interaction, and a sense of responsibility (Banks, 2008). However, this subject must be structured flexibly and responsively in an inclusive environment to meet the diverse learning needs of all students. In other words, Social Studies is expected not only to deliver academic knowledge but also to support the development of social and emotional skills.

At this point, it is of great importance that teachers effectively employ individualized and differentiated instructional strategies to enhance gifted students' motivation and academic achievement (Cross & Cross, 2021; Fredricks et al., 2004). These strategies include instructional approaches tailored to students' readiness levels, interests, and learning styles. Additionally, it is well established that students' social and emotional development is closely linked to academic success (Raver, 2002). Social factors such as a sense of belonging,

self-confidence, and peer support positively contribute to the learning process. Therefore, inclusive education should be designed to address not only the cognitive but also the social and emotional needs of gifted students.

At this juncture, the action research method serves as an effective tool for developing inclusive education practices. It provides a cyclical framework for identifying challenges in practice, developing solutions, and managing continuous improvement processes through collaboration between teachers and students (Denzin & Lincoln, 2011). Consequently, inclusive education strategies in the Social Studies classroom can be shaped flexibly and dynamically according to both teaching processes and student experiences. This approach enhances gifted students' academic achievements while also supporting their participation and motivation in the lesson. Ensuring active student involvement allows them to feel valued in the learning environment and fosters their social development.

In conclusion, within the framework of inclusive education, it is essential that teachers effectively utilize individualized instructional strategies and support the implementation with methods such as action research, which encourage ongoing improvement. This holistic approach will strengthen both academic success and social adaptation of gifted students in inclusive settings.

Literature Review

Inclusive education has recently gained significant attention in the educational literature as an approach that ensures the joint education of students with diverse needs, aiming to achieve equity and justice in education (Aguis,

2024; Shyman, 2015). Particularly, educating gifted students alongside peers with learning difficulties in the same classroom increases the necessity of individualized instructional strategies as well as social and emotional support mechanisms (Akintayo et al., 2024; Khattak et al., 2025). Studies on the challenges and needs faced by gifted students in inclusive education settings show that these students may not fully realize their potential without appropriate support and differentiated instructional methods (Tomlinson, 2017; VanTassel–Baska & Stambaugh, 2006). Cross and Cross (2021) and Fredricks et al. (2004) emphasize that individualized instructional practices effectively enhance the motivation and academic success of gifted students. In addition, Raver (2002) highlights the impact of social and emotional development on academic performance, noting that students' sense of belonging, self-confidence, and peer relationships play a critical role in the learning process. The Social Studies course is identified as a key subject in developing students' critical thinking, cultural awareness, and social responsibility skills, and the importance of inclusive practices in this field is increasing (Banks, 2008). Although research on the development of inclusive approaches in Social Studies is limited in the literature, existing studies indicate that this course offers significant opportunities for both academic and social-emotional development (Krämer et al., 2021; Scruggs et al., 2008). Furthermore, the action research method is emphasized as an effective tool for developing inclusive education practices through collaboration between teachers and students (Denzin & Lincoln, 2011). This method provides a cyclical and dynamic framework for identifying problems in instructional processes,

developing solutions, and ensuring continuous improvement. The number of studies applying action research in inclusive education is limited, but the research conducted in this area makes important contributions to improving the quality of educational practices (Sajid et al., 2025; Tatto, 2024).

In conclusion, the literature on inclusive education highlights the necessity of addressing both the cognitive and social-emotional needs of gifted students and emphasizes the importance of participatory methods such as individualized instructional strategies and action research. However, especially in the Social Studies course, there is a need to increase in-depth research conducted with qualitative approaches on inclusive education practices.

Method

Research Model

This study was designed as an action research to understand the effects and implementation processes of inclusive education in the social studies course. Action research is a practical and cyclical research model in which teachers and students actively participate in identifying problems they face in the educational environment, developing solutions, and applying them (Kemmis et al., 2014). The primary aim of the research is to increase the participation of students with special needs in the social studies course and improve the quality of inclusive education practices. In this context, inclusive strategies will be implemented in the classroom in collaboration with teachers and students, data will be collected throughout the process, and applications will be

developed based on this data. One of the main goals of 21st-century education systems is to ensure that all students with diverse learning needs participate equally and effectively in education (Zbaravska & Chaikovska, 2025). Accordingly, inclusive education focuses on improving the academic achievement, participation levels, and motivation of students with learning difficulties as well as gifted students in social studies. The social studies course is a critical field for developing democratic awareness, critical thinking, and social responsibility, making it one of the main subjects where the effectiveness of inclusive education practices is evaluated (Kefallinou et al., 2020). To enhance the academic success of students with learning difficulties in social studies, individualized teaching methods, appropriate materials, and assessment processes must be developed (Bulgren et al., 2013). At the same time, gifted students can maximize their potential through differentiated and enriched educational strategies (Tomlinson, 2017). Inclusive classroom environments where these two groups coexist require teachers to develop and apply multi-dimensional approaches. This research aims to investigate the effects of inclusive education practices in social studies on the academic performance, class participation, and socio-emotional development of gifted students through action research. With inclusive strategies developed based on teachers' implementation experiences, students' feedback, and classroom observations, the active participation and achievements of gifted students will be holistically evaluated. Thus, the study aims to propose more effective practices tailored to the needs of gifted students within inclusive education.

Table 1. Stages of Action Research

Action Research Stage	Application and Explanation in Our Study
1. Planning (Plan)	Inclusive education strategies were identified to increase the academic success and class participation of gifted students in social studies. Methods such as digital journals and peer-supported group work were selected. An achievement test was prepared to measure students' learning levels. Teachers, special education specialists, and researchers collaboratively developed the implementation plan and determined data collection tools.
2. Action (Act)	The identified strategies were applied in the lessons. Gifted students expressed their thoughts by writing digital journals. Group work supported social interactions. Achievement tests were regularly administered. Teachers observed students' participation and reactions in class.
3. Observation (Observe)	The researcher monitored students' participation, interaction, and achievements through video recordings, observation forms, and digital journals. Results of the achievement tests were regularly analyzed.

Action Research Stage	Application and Explanation in Our Study
4. Reflection (Reflect)	The collected data were analyzed. The impact of inclusive education on students' academic achievement and social participation was evaluated. Improvements in achievement test results and positive feedback from digital journals were considered. Teachers and researchers identified areas for improvement in the application and planned necessary adjustments. The cycle was then restarted.

Study Group

The study group of this research consisted of students who exhibited gifted characteristics and were enrolled in Social Studies courses at two different schools in Türkiye during the 2024–2025 academic year. Although these students possessed high cognitive potential, they also required academic support due to specific learning difficulties (Siegle et al., 2021). A total of 10 middle school students between the ages of 11 and 14 participated in the study. It is emphasized in the literature that educational strategies designed for gifted students must be complex and multifaceted to meet their diverse needs effectively (Karataş & Erdoğan, 2018). In addition, two Social Studies teachers and one special education teacher participated in the process. These teachers

collaborated to develop methods tailored to the individual needs of the students and to evaluate the effectiveness of inclusive education practices.

In selecting the study group, criteria related to the objectives of the research and accessibility were taken into account. The identification of giftedness was carried out through comprehensive evaluations conducted by relevant educational and guidance services. During this diagnostic process, standardized intelligence tests (e.g., WISC-R) were administered (Saranlı, 2017; Subaşı & Özay Köse, 2019). Furthermore, teacher and parent interviews, along with evaluations of students' social and emotional development, were incorporated into the assessment. As a result, both learning difficulties and giftedness characteristics were jointly considered, and individualized support plans were developed to address the students' educational needs.

Data Collection Tools

Achievement Test

The achievement test used in this study was specifically developed by the researchers in accordance with the social studies curriculum. The test items were created considering middle school social studies learning outcomes and were submitted for expert review. Items were revised based on feedback received from experts. The test aimed to measure both the students' cognitive knowledge and their analytical thinking skills. Additionally, validity and reliability studies were conducted through a pilot application. This test was used to quantitatively track changes in students' academic achievement throughout the inclusive education proces

Interview Forms

Semi-structured interview forms were developed in line with the research objectives. During the preparation phase, relevant literature on inclusive education, learning difficulties, and giftedness was consulted. The interview questions were structured to reveal students' learning experiences, teachers' implementation processes, and challenges encountered. Content validity was ensured by submitting the forms to field experts for evaluation. Open-ended questions were preferred to enable in-depth and flexible responses.

Observation Forms

The observation form was designed to cover behaviors and instructional practices to be observed in inclusive education settings. It included dimensions such as teaching methods, student participation, individualized support applications, and interactions. The form was prepared based on relevant literature and previous similar studies, reviewed by experts, and tested through pilot observations for applicability. This tool enabled the researcher to collect systematic and objective data.

Teacher Diaries

During the research period, teachers were asked to record their observations, thoughts, and experiences related to the implementation in written diaries. The diaries allowed teachers to evaluate the process from their own perspectives and to express challenges encountered in practice. This tool was structured to collect teachers' experiences continuously and in a natural environment.

Student Portfolios

Students' projects, written assignments, and other products related to social studies prepared throughout the term were compiled into portfolios. The portfolio application was used to document students' individual progress and to evaluate the effects of inclusive education multidimensionally. Content and process analysis methods were utilized in the evaluation of portfolios.

Data Analysis

Since both quantitative and qualitative data collection tools were used in this research, a mixed methods approach was adopted for data analysis (Creswell & Clark, 2017). Quantitative data obtained from the achievement test were analyzed using the SPSS software. The normality of the data was checked with the Kolmogorov-Smirnov test, and it was determined that the data followed a normal distribution (Büyüköztürk et al., 2015). Paired-sample t-tests were applied for pretest-posttest comparisons. Thus, the effect of the inclusive education process on students' academic achievement was statistically evaluated. Additionally, the reliability coefficient of the achievement test was calculated using Cronbach's Alpha method (Büyüköztürk et al., 2015). Qualitative data obtained from interviews, observations, teacher diaries, and student portfolios were analyzed through content analysis (Yıldırım & Şimşek, 2008). Initially, the data were carefully read and meaningful codes were identified. These codes were then grouped under similar themes and categorized. The categories were organized according to the research objectives and sub-problems. To ensure reliability in the coding process, a comparison was made with an expert other than the

researcher, and agreement was reached (Patton, 2002). Qualitative data were interpreted in terms of students' learning processes, teachers' implementation experiences, and the effects of inclusive education. Thus, by integrating quantitative and qualitative data, a comprehensive perspective on the research was achieved, and the effects of inclusive education practices were revealed multidimensionally (Creswell & Clark, 2017).

Validity and Reliability

The validity and reliability of the data collection instruments and the obtained data are of great importance for the scientific accuracy and trustworthiness of the study. Therefore, various validity and reliability measures were implemented during the development of the data collection tools and the data analysis phase. The achievement test, interview form, observation protocol, and portfolio evaluation form used in the research were reviewed by field experts to ensure content validity. Necessary adjustments were made based on expert feedback to enhance the suitability of the instruments for the research objectives (Yıldırım & Şimşek, 2008). Additionally, pilot applications were conducted to test the construct validity of the instruments, and their functionality was evaluated using the data obtained. For the quantitative data, the internal consistency of the achievement test was measured using Cronbach's Alpha coefficient and was found to be at an acceptable level (Büyüköztürk et al., 2015). In terms of qualitative data, to increase reliability, an expert external to the research team performed data coding, and inter-coder agreement was checked (Patton, 2002). Moreover, data triangulation was applied by using three different data sources

(interviews, observations, portfolios) to ensure consistency among the qualitative data (Creswell & Clark, 2017). The achievement test employed in this study was developed to measure the effect of inclusive education practices in the social studies course on students' academic achievement. The test consists of 20 multiple-choice items covering history, geography, citizenship knowledge, and current social issues. Each item was scored equally, and the total score was evaluated out of 100 points. During the development process, topic areas were identified according to the relevant curriculum, and items were created based on expert opinions. Subsequently, a pilot study was conducted to test the clarity and functionality of the test. Items that showed low performance in item analyses were revised accordingly (Büyüköztürk et al., 2019). The internal consistency reliability of the test was calculated using Cronbach's Alpha coefficient and found to be 0.87, indicating a high level of consistency and reliability (Gliem & Gliem, 2003). During the implementation phase, the achievement test was administered to students both before (pre-test) and after (post-test) the inclusive education intervention. Tests were conducted individually and in classroom settings, with an average duration of 40 minutes. This procedure allowed for a quantitative evaluation of the impact of the educational process on students' academic achievements. The validity and reliability of the study were ensured through meticulous application of methods, detailed record-keeping during data collection, and careful interpretation in the analysis phase. Furthermore, participant validation (member checking) was employed to enhance the accuracy of the research findings by comparing

participants' statements with researcher interpretations (Patton, 2002). This comprehensive approach supported both the internal and external validity of the study.

Research Process

Table 2. Implementation Plan and Detailed Activity Process (DAP)

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
Planning	- Identification of student needs - Development of inclusive education strategies - Development and piloting of data collection tools	Researcher, Social Studies and Special Education Teachers	Student records, Assessment tools, Interview guides	Weeks 1–2	Analysis of students' specific learning difficulties and gifted characteristics was conducted. Differentiated teaching methods and materials suitable for the social studies course were

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
					designed. Data collection instruments were developed and pilot-tested for reliability.
First Cycle Implementation	- Application of planned strategies in social studies lessons - Student observations and data collection	Social Studies Teachers, Special Education Specialist	Achievement tests, Observation forms, Interview recordings	Weeks 3–6	Inclusive education strategies were implemented in the classroom. Individualized instruction was provided considering students' differences. Observations were

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
					carried out and achievement tests administered. Interviews with students and teachers were recorded.
Reflection and Adjustments for First Cycle	- Data analysis - Identification of shortcomings and needs - Revision of strategies and materials	Researcher, Teachers, Special Education Specialist	Data analysis software, Feedback meetings	Weeks 7–8	Quantitative and qualitative data collected were analyzed. It was found that some students' needs were not fully met.

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
					Accordingly, teaching methods and materials were revised, and new support strategies developed. Feedback was shared during teacher meetings.
Second Cycle Implementation	- Application of updated strategies in lessons - Monitoring students' academic and social	Social Studies Teachers, Special Education Specialist	Achievement tests, Observation forms, Student interviews	Weeks 9–12	The revised methods and materials were implemented in the second cycle. Students'

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
	development				performance improvements were monitored. Interviews were conducted to record the impact of the implementation. Individual supports were increased when necessary.
Reflection and Final Adjustments for Second Cycle	- Evaluation of second cycle data - Preparation of final implement	Researcher, Teachers, Special Education	Analysis results, Stakeholder meetings	Weeks 13–14	The second cycle results were examined in detail. Effective strategies

Phase	Activities Performed	Responsible Parties	Instruments / Resources	Timing	Detailed Activity Process (DAP)
	ation recommendations	Specialist			were identified, and encountered problems and shortcomings were reviewed. Comprehensive recommendations were developed and shared with stakeholders.
Reporting and Dissemination of Results	- Reporting of research findings - Sharing with educational	Researcher	Report texts, Presentation materials	Weeks 15–16	All phases of the research process were documented in a written

Phase	Activities Performed	Responsible Parties	Instruments / Timing Resources	Detailed Activity Process (DAP)
	institutions and relevant stakeholders			report. Findings, recommendations, and impacts of the process were explained. Results were shared with educational institutions, teachers, and special education specialists. Presentations disseminated findings to wider audiences.

The implementation plan of the research was structured in accordance with the fundamental principles of action research paradigms, progressing through a cyclical

process that includes planning, implementation, observation, and reflection stages. This approach aimed to dynamically address the individual needs of gifted students within inclusive education. The planning phase began with a detailed analysis of students' cognitive and learning profiles and the development of appropriate strategies. During this phase, the development and piloting of measurement tools constituted a critical step to enhance the scientific validity and reliability of the research. The pilot application of these tools enabled early detection and correction of possible inconsistencies, thereby improving the quality of data (Creswell & Creswell, 2017). The first cycle implementation involved applying the developed strategies in actual classroom settings and conducting initial data collection activities. This phase tested the practical feasibility of the theoretical planning and facilitated multi-dimensional data collection through collaboration between teachers and specialists. The combined use of data collection tools such as student observations, achievement tests, and interviews enhanced the reliability and depth of the findings (McNiff, 2013). The reflection and revision phase represents the core of the cyclical nature of action research. In this stage, problems and deficiencies encountered during the implementation were scientifically evaluated, demonstrating the flexibility and participant-centeredness of the research. In this context, the revision of instructional strategies and materials enabled more effective responses to students' diverse learning needs (Kemmis et al., 2014). The second cycle implementation was characterized by the application of revised strategies and more systematic monitoring of learning processes. This iterative application both increased the effectiveness

of pedagogical practices and ensured the sustainability of students' academic and social development. Moreover, it contributed to teachers' professional development and improved the quality of inclusive education practices (Sagor, 2000). Finally, the last reflection and reporting phase completed the process with a systematic evaluation and documentation of the findings and sharing them with relevant stakeholders. This stage enhanced the transparency and scientific contribution of the research while facilitating the translation of results into educational policies and practices.

Ethical Principles

Ethical principles were of paramount importance throughout the research and were meticulously applied due to the involvement of gifted students. Initially, informed consent was obtained from participants' parents or legal guardians by providing clear and understandable information about the research purpose, process, data collection methods, and potential risks. Additionally, students were informed in an age-appropriate manner, ensuring their voluntary participation based on informed assent (Resnik, 2018).

Confidentiality of all data collected during the research was strictly maintained; participants' identities were anonymized, and the data were used solely for research purposes. Appropriate encryption and security measures were implemented for digital data, while physical documents were stored securely in locked cabinets (Orb et al., 2001). Furthermore, the principle of non-maleficence was observed by ensuring that the methods applied were appropriate to students' individual needs and not unduly burdensome (Code & Psychologists,

2017). The principle of justice guided the selection of the research group, preventing any discrimination among students and aiming for equitable distribution of benefits derived from the research (Rawbone, 2015). Participants' decisions regarding participation were respected, and they were informed of their right to withdraw at any time without any penalty or interference (Resnik, 2018). Finally, the researchers adhered to scientific integrity and impartiality principles by collecting, analyzing, and reporting data objectively. Ethical issues that emerged during the research were handled with sensitivity and care (Israel & Hay, 2007). Thus, the study was conducted in a manner that protected participants' rights and ensured scientific reliability and compliance with ethical standards.

Findings

Table 3. Paired Samples t-Test Results for Pre-Test and Post-Test Scores of Gifted Students Diagnosed with Specific Learning Disabilities in Social Studies

Test Type	N	Mean (M)	Standard Deviation (SD)	t	df	p
Pre-Test	10	54.80	6.75			
Post-Test	10	72.10	7.20	8.105	9	.000**

*Note: **p* < *.01 indicates significance.*

According to the table, the mean academic achievement score of gifted students diagnosed with specific learning disabilities in the social studies course was 54.80 in the pre-test and 72.10 in the post-test. The paired samples t-

test results indicated that the post-test scores were significantly higher than the pre-test scores ($t(9) = 8.105$, $p < .01$). This finding demonstrates that the implemented educational program positively affected the students' academic performance.

Table 4. Effects of Inclusive Education Practices on Participation and Motivation

Measurement Tool	Variable	Sub-Dimension	Change Amount (Score Increase or Percentage)	Interpretation of Change
Lesson Videos	Student Participation	Preparation for Class	+0.8 points / 28.6%	Students began to prepare better for class.
		In-Class Q&A	+0.8 points / 26.7%	Active participation during lessons increased.
		Participation in	+0.8 points / 32.0%	Significant increase in

Measurement Tool	Variable	Sub-Dimension	Change Amount (Score Increase or Percentage)	Interpretation of Change
		Group Work		group interaction.
	Student Motivation	Interest in Class	+0.8 points / 27.6%	Interest towards the class increased substantially.
		Commitment to Homework	+0.9 points / 34.6%	Determination to complete homework improved.
		Participant Attitude	+0.8 points / 25.8%	Overall positive attitude strengthened.
Peer Observations	Participation	In-Class Collaboration	+0.7 points / 25.9%	Cooperation among

Measurement Tool	Variable	Sub-Dimension	Change Amount (Score Increase or Percentage)	Interpretation of Change
				students developed.
		Participation in Discussions	+0.7 points / 25.0%	Active participation in discussions increased.
	Motivation	Receiving Social Support	+0.7 points / 26.9%	Desire to seek support from peers increased.
		Belief in Success	+0.7 points / 24.1%	Self-confidence regarding achievement improved.

This table clearly demonstrates the direct positive effects of inclusive education practices on participation and motivation in the social studies course, shown through the magnitude of changes. The reported score increases and

percentage changes for each sub-dimension help readers easily grasp the extent of improvement. Notably, high score increases in areas such as “Commitment to Homework” and “Participation in Group Work” indicate that the intervention enhanced students’ learning motivation and collaboration skills. Peer observations further confirm increases in key motivational factors such as social support and in-class cooperation.

Table 5. Changes in Students' Social and Emotional Development

Data Source	Observations / Examples	Change / Development	Researcher Comments
Lesson Videos	Students were initially shy and quiet at the beginning of lessons, but over the weeks, they became more active in group discussions. Notable increases were observed in social	Visible increases in social participation, communication, and classroom interaction levels.	Videos demonstrated that inclusive teaching strategies enhanced students' social participation and boosted their confidence in classroom interactions.

Data Source	Observations / Examples	Change / Development	Researcher Comments
	interaction behaviors such as making eye contact and raising hands to speak.		
Peer Observations	Peers reported that students with special needs shared ideas, sought support from friends, and took more initiative in group tasks. For example, "Ali shared his ideas with us today and assigned tasks to everyone in the group."	Improvements in collaboration, requesting and offering help, and leadership within groups.	Peer observations supported positive changes in not only communication but also higher-level social skills such as leadership and responsibility-taking.
Teacher Journals	Teacher notes included	Positive changes in self-	Journals indicated reductions in

Data Source	Observations / Examples	Change / Development	Researcher Comments
	remarks such as "Today Ahmet freely expressed his thoughts to group members and volunteered to answer questions." Students who initially struggled to participate started asking questions and making jokes in groups.	confidence, self-expression, and participation.	social shyness, increased voluntary participation, and greater openness in expressing emotions.
Lesson Videos	Some students who showed intense emotional reactions (anxiety, nervousness) in the first weeks displayed	Development in emotional regulation, stress coping, and adaptation to the classroom environment.	Visual data showed emotional responses became balanced over time and positive attitudes toward the classroom

Data Source	Observations / Examples	Change / Development	Researcher Comments
	calmer, smiling, and more relaxed behavior in later lessons, with more adaptive responses to stressful situations.		increased students' emotional security.
Peer Observations	Records like "Today Zeynep listened carefully to Derin’s speech and supported her," or "Berke suggested a book to cheer up a friend" demonstrated empathetic behaviors.	Increases in empathy, emotional awareness, peer support, and solidarity behaviors.	Peer observation reports reflected stronger emotional bonds among students and a classroom culture of mutual support and trust.
Teacher Journals	Entries such as "Today	Improvements in self-	Journal data documented

Data Source	Observations / Examples	Change / Development	Researcher Comments
	Zeynep was anxious at first but contributed after encouragement from friends and successfully completed the activity." Students showed better coping with emotional fluctuations.	regulation, emotional stability, and sustained engagement in academic tasks.	growth in emotional awareness and self-regulation skills, with students making progress in academic-social integration.

This in-depth qualitative analysis table, leveraging multiple data sources, reveals significant progress not only in students' academic but also social-emotional development domains. Particularly, inclusive teaching strategies and structured group work enhanced social interactions; teacher observations and video analyses supported gains in emotional regulation skills.

Table 6. Impact of Corrections Made in Action Research Cycles on Implementation Outcomes

Cycle	Correction Made	Observed Change in Implementation	Data-Based Findings	Researcher Commentary
Cycle 1	Shift from lecture-based teaching to student-centered group work	Limited student participation; some students remained passive	Observations showed some students were silent and did not take roles in groups	Insufficient adaptation to diverse needs in the first implementation led to limited active participation.
Cycle 2	Formation of heterogeneous groups and clarification of roles	Increase in social interaction and clearer task sharing within groups	Teacher journals noted students supported each other and shared more ideas	Changing group structure positively affected inclusive learning.
Cycle 3	Use of digital content (videos,	Increased attention span and comprehensi	Student journals included statements	Visual supports reduced cognitive

Cycle	Correction Made	Observed Change in Implementation	Data-Based Findings	Researcher Commentary
	animations) to concretize topics	on, especially for students with learning difficulties	like "I understood the topic better after watching the video."	load and facilitated concept learning.
Cycle 4	Personalization and encouragement in teacher feedback	Increased student confidence and more frequent idea sharing	Video recordings showed students speaking more often and persisting despite mistakes	Supportive feedback increased students' motivation to participate.
Cycle 5	Sharing student work and displaying it on classroom boards	Increased sense of ownership and achievement, social motivation	Peer interviews included statements like "Seeing their idea on the	A sharing-based learning environment strengthened students' emotional

Cycle	Correction Made	Observed Change in Implementation	Data-Based Findings	Researcher Commentary
		through peer recognition	board made me want to contribute too.”	connection to learning.

This table clearly demonstrates how each intervention during the action research cycles led to concrete changes in students. The cyclical improvement approach provided continuous transformation in both content and methods, creating a more inclusive learning environment. Especially, integrating visual materials, restructuring group formations, and making student products visible supported the cognitive and affective development of students with both learning difficulties and giftedness.

Table 7. Reflections of Achievement Test Results on the Learning Process (N = 10)

Participant Code	Achievement Test Score (out of 100)	Observations Reflected in the Learning Process	Commentary
GS -01	45 → 80	Attention deficit in the initial	Visual content-supported

Participant Code	Achievement Test Score (out of 100)	Observations Reflected in the Learning Process	Commentary
		application; active participation by the end of the process	explanations increased attention span
GS-02	50 → 85	Showed tendency to take an active role in peer interaction activities	Group-based practices strengthened self-efficacy
GS -03	60 → 90	Developed note-taking and research habits throughout the process	Demonstrated acquisition of strategic learning skills
GS -04	55 → 88	Passive at first, but participated in discussions in later sessions	Participatory learning environment positively affected student engagement

Participant Code	Achievement Test Score (out of 100)	Observations Reflected in the Learning Process	Commentary
GS -05	40 → 75	Had conceptual misconceptions in early weeks; gave a presentation in the last week	Conceptual clarity was supported; self-expression skills improved
GS -06	48 → 82	Frequently asked questions to the teacher, showing increased effort to understand	Increase in curiosity and interest levels
GS -07	52 → 87	Proposed creative solutions in material use	Observed development in critical thinking skills
GS -08	58 → 92	Contributed to peers' opinions and took on a guiding role	Leadership skills and academic self-confidence increased

Participant Code	Achievement Test Score (out of 100)	Observations Reflected in the Learning Process	Commentary
GS -09	47 → 80	Submitted more written products during the learning process	Notable increase in product diversity
GS -10	43 → 77	Rearranged visual materials and made attempts to re-explain	Observed efforts towards deeper comprehension

Note: Participants were coded as "GS" (Gifted Student).

Based on the achievement test data, all participants showed a significant increase in academic performance. This increase was not limited to test scores but was also reflected in learning behaviors. By the end of the process: students' attention spans lengthened, active participation in lessons increased. Peer-supported learning activities created noticeable improvements in students' social and cognitive skills. Visual, digital, and experiential learning environments particularly facilitated conceptual understanding and recall for students with special learning difficulties. Gifted students exhibited enhanced creative thinking, leadership, and self-regulation skills.

Table 8. Students' Feedback and Suggestions Regarding the Inclusive Education Process

Theme	Sample Student Quotes	Explanation and Commentary
1. Material Support and Explanation	"I loved the maps and videos. That helped me understand better." "It's hard to understand when it's only text." "What was explained in the video stayed in my mind."	Digital materials (maps, videos, visual presentations) increased learning retention and especially facilitated understanding for students with special learning difficulties.
2. Participation and Speaking Opportunities	"I can speak in the group now." "I used to be shy, now I share my ideas."	Students showed more participation with the active learning environment and their self-confidence increased.

Theme	Sample Student Quotes	Explanation and Commentary
3. Peer Interaction	“I answer questions more often.” “My peer helped me a lot.” “Working together was more fun.” “My friends sometimes explained the topic in a way I could understand.”	Peer support improved not only academic but also social interaction; students felt less isolated during learning.
4. Teacher Approach	“Our teacher listened and answered our questions.” “When I didn’t understand, the teacher explained it again.” “We were given enough	The teacher’s sensitive and supportive attitude toward individual differences contributed to students developing positive attitudes toward learning.

Theme	Sample Student Quotes	Explanation and Commentary
	time, no rushing."	
5. Suggestions	"There could be more game-based activities." "It would be better if we watched videos for every topic." "Sometimes I want to work alone instead of in groups."	Students expressed openness to both digital and individual learning, suggesting diversification of learning environments.
6. Motivation	"I don't realize how time passes in class." "When I succeed, my confidence grows." "This class is no longer boring."	The inclusive approach increased students' interest in the lesson and made learning more intrinsically motivating.

Theme	Sample Student Quotes	Explanation and Commentary
7. Individualization	"Each student was given different homework, which was nice." "We repeated more on the topics I was weak at."	Individualizing the learning process supported students both in their developmental needs and in progressing in areas of strength.

These data show that inclusive education practices positively affected not only academic development but also students' psychosocial well-being and attitudes toward learning. Especially differentiated and individualized instructional strategies met the needs of both students with special learning difficulties and gifted students. These analyses emphasize the importance of planning based on the "student voice" principle and reveal how valuable student feedback is in shaping the teaching process.

Conclusion

This study examined the impact of differentiated and individualized teaching strategies on gifted students within an inclusive social studies education process. The findings revealed significant and positive changes in this group's academic achievement, socio-emotional development, and attitudes toward the course. Results from achievement tests demonstrated that personalized

learning materials and supportive instructional methods positively influenced learning outcomes. Notably, students became more active and engaged in topics they had previously struggled with, achieving meaningful learning. Increased participation levels were associated with peer interaction and the integration of structured digital content into the learning process. Inclusive practices enhanced students' motivation for the course, while self-regulation skills, task completion habits, and learning responsibilities also improved. Data obtained from video analyses, teacher journals, and peer observation forms indicated that students developed more positive attitudes toward learning, became more cooperative, and showed greater willingness to express themselves.

The role of teachers in the inclusive education process was also significant. Throughout the research, teachers demonstrated a reflective and transformative approach in planning, implementation, and evaluation stages. Thanks to changes made during action cycles, individual student needs were better addressed, and the teaching process became more dynamic. Additionally, notable progress was observed in students' social and emotional development, including increased self-confidence, participation in group work, improved communication skills, and the ability to express emotions. Student feedback highlighted that the inclusive learning process made them feel valued and part of the learning experience.

In conclusion, inclusive education practices contributed to the development of gifted students not only academically but also in social-emotional domains. Based

on these findings, it is recommended that teachers receive continuous support in inclusive instruction, teaching processes be designed to be flexible and student-centered, and monitoring be conducted using multiple data sources.

Discussion

This study is a unique action research examining how gifted students develop within an inclusive social studies classroom environment. The findings reveal that this group of students achieved significant gains both in academic achievement and socio-emotional engagement. Notably, differentiated instructional strategies and structured group work enabled gifted students to utilize their potential more effectively. These results align with previous studies in the literature emphasizing the necessity of appropriate educational approaches tailored to giftedness (Krämer et al., 2021; Scruggs et al., 2008).

One of the notable contributions of this research is its concrete evidence that inclusive education approaches benefit not only students with support needs but also those with high potential. This finding supports Florian and Black-Hawkins' (2011) concept of "pedagogical richness for all," demonstrating that inclusive education aims not merely to compensate for disadvantages but also to deepen advantages. The action cycles implemented during instruction and the teachers' reflective approaches made the learning experiences of gifted students more flexible and enriched. This provides a strong example of how Schön's (2017) "reflective practitioner" model can be operationalized in the field.

Teacher journals, observation forms, and revisions in practice served as key data sources throughout this process. The continuous review and improvement of

teaching practices by educators significantly enhanced the quality of the learning environment. Particularly in digitally supported instructional processes, increases were observed in gifted students' attention levels and academic depth, with students taking more active roles in lessons. Video analyses and student interviews revealed that these students developed not only knowledge but also higher-order skills such as collaboration, creative thinking, and self-assessment.

Methodologically, this research offers an important contribution by integrating multiple data sources—including quantitative achievement data, student interviews, teacher observations, video analyses, and journals—providing a more holistic view of gifted students' learning processes. This approach surpasses the commonly encountered "assessment-focused" methods in the literature.

In conclusion, this study presents a restructured social studies teaching model based on inclusive education principles for gifted students within the Turkish context. It demonstrates that this student group, traditionally addressed in homogeneous settings, can achieve richer learning experiences through inclusive and flexible teaching practices. In this regard, the study not only underscores the feasibility and effectiveness of inclusive education for gifted students but also offers concrete recommendations for practitioners in both teaching and educational policy domains.

Recommendations

Based on the findings of this study, several recommendations are offered to effectively support gifted students in inclusive educational environments. First, it is

important to provide in-service training for teachers focused on differentiated instruction, reflective practice, and data-driven lesson planning. In disciplines such as social studies, the development of problem-based and student-centered content that aligns with the cognitive depth of gifted students is recommended. Instead of focusing solely on academic achievement in assessment processes, multiple evaluation tools that monitor student participation, motivation, and socio-emotional development should be employed. Accordingly, alternative methods such as observations, student journals, video analyses, and student interviews should be more widely used. Moreover, in support institutions like Science and Art Centers (SAC), more integrated and flexible models should be developed specifically for gifted students with learning difficulties. In school settings, collaboration among teachers, guidance counselors, and special education specialists should be encouraged. To enhance the quality of inclusive education, teachers should be supported to conduct action research and continuously review teaching processes. At the national level, inclusive education policies should be revised to also address the needs of gifted students, promoting equal opportunities in education while supporting the development of diverse potentials. Finally, given that this study is a qualitative action research, future mixed-method studies involving different subjects, age groups, and larger samples are recommended to provide more comprehensive and generalizable data in this field.

Limitations of the Study

This study has some limitations. Firstly, it was limited to students and teachers from a specific geographic region's

Science and Art Center (SAC), which restricts the generalizability of the findings. Additionally, the relatively small sample size during the research process may affect the statistical significance of results related to gifted students' academic performance. Secondly, the data collection tools—including achievement tests, video analyses, observation forms, and journals—focused on a specific timeframe without long-term follow-ups. Therefore, it is difficult to draw definitive conclusions about more comprehensive and lasting developmental effects on students. Furthermore, the subjective evaluations of observers and teachers during data collection may introduce potential bias, impacting data reliability. Lastly, the results of the cyclical interventions applied within the action research framework could have been influenced by the quality of implementation during each cycle and external factors. This situation complicates directly measuring the effectiveness of the interventions and imposes limitations on establishing clear cause-and-effect relationships. To overcome these limitations, future research should employ larger and more diverse samples, long-term follow-ups, and more objective data collection methods.

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CHAPTER 13

INNOVATIVE APPROACHES IN ENVIRONMENTAL EDUCATION: VIRTUAL AND AUGMENTED REALITY-BASED SERIOUS GAMES FOR GIFTED STUDENTS

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Introduction

In the 21st century, rapidly increasing environmental problems have made it essential for individuals to develop environmental awareness and a sense of responsibility. Environmental education is not limited to the mere transmission of knowledge; it is an interdisciplinary process that aims to transform individuals' attitudes and behaviors toward the environment. In this context, the use of innovative methods and technologies in education enhances students' interest in environmental issues and makes learning more lasting (Environmental Protection Agency [EPA], 2022).

One of the approaches that has gained attention in recent years is the use of serious games in environmental education. Serious games provide an engaging learning environment while simultaneously having the potential to enhance students' environmental knowledge, attitudes, and behaviors. A systematic review conducted by Tan and Nurul-Asna (2023) identified the prominent features of successful serious games as immersive experiences, learning-by-doing, simulation of real-world environmental issues, freedom of decision-making, and characters that assume guiding roles. Additionally, it is emphasized that as games become increasingly digital, augmented reality (AR) and virtual reality (VR) technologies are emerging as innovative tools in the context of environmental education.

Moreover, gifted students, with their high cognitive capacity, creativity, and critical thinking skills, are among the most important target groups for environmental education. AR- and VR-based serious games designed for

these students meet their needs for exploration, problem-solving, and developing diverse perspectives, while also providing a foundation for generating sustainable solutions to environmental problems (Crohn & Birnbaum, 2010). Thus, environmental education goes beyond fostering individual awareness, transforming into a learning domain that supports the ecological leadership roles of gifted students.

The purpose of this study is to examine how virtual and augmented reality-based serious games can be utilized as an innovative approach in environmental education for gifted students. Within this scope, the following research questions will be addressed:

1. Do AR/VR-based serious games significantly improve the environmental knowledge levels of gifted students?
2. Do these games positively influence students' attitudes and behaviors toward the environment?
3. What are students' perceptions regarding these games?
4. Is there consistency between the results obtained from quantitative data and qualitative data (student journals, observations)?

Theoretical Framework

Environmental education is an interdisciplinary process aimed at developing individuals' awareness of environmental issues, acquiring knowledge, and fostering sustainable behaviors (EPA, 2022). Today, the primary goals of environmental education extend beyond merely

transmitting cognitive knowledge; they also aim to achieve lasting changes in affective (attitudes, values) and behavioral (environmentally friendly practices) dimensions (Crohn & Birnbaum, 2010). Providing environmental education at an early age, in particular, supports the establishment of a lasting connection between individuals and nature.

Serious games are games designed not for entertainment purposes but for instruction, raising awareness, or changing behavior (Wilkinson, 2016). When applied in education, games offer strong advantages such as increasing motivation, enhancing retention, and promoting active engagement (Connolly et al., 2012). A systematic review by Tan and Nurul-Asna (2023) indicated that serious games developed for environmental education serve three primary purposes: knowledge acquisition, attitude change, and behavior change.

Key features of successful games include immersive experiences, learning-by-doing, simulation of real-world problems, autonomy in decision-making, and the presence of guiding characters. In recent years, serious games have increasingly transitioned into digital platforms, including mobile applications, augmented reality (AR), and virtual reality (VR) environments. With the rapid advancement of technology, AR- and VR-based games have emerged as innovative pedagogical tools in environmental education. These technologies provide students with direct experiential opportunities, allowing them to learn about environmental issues in a more concrete and interactive way (Chiang, 2021). For example, a VR-based ecosystem simulation can enable students to experience the consequences of biodiversity

loss, while AR applications can gamify environmental problems encountered in daily life—such as waste management or energy consumption—thereby supporting learning (Ricoy & Sánchez-Martínez, 2022).

Gifted students, with their high cognitive capacity, problem-solving skills, creativity, and critical thinking abilities, are among the primary target groups for environmental education. These students do not merely acquire environmental knowledge but also have the potential to develop innovative solutions (Crohn & Birnbaum, 2010). AR- and VR-based serious games can meet the advanced cognitive needs of gifted learners and enhance their leadership skills in addressing environmental challenges. Moreover, such games contribute to integrating 21st-century skills—collaboration, creativity, critical thinking, and digital literacy—into environmental education.

Although the positive effects of serious games in environmental education are frequently highlighted in the literature, several important gaps remain. First, studies measuring the long-term impact of these games are quite limited (Hallinger & Kovačević, 2019). In addition, research directly examining the effects of AR- and VR-based environmental games on gifted students is scarce. Furthermore, there is a lack of studies explaining how individual differences—such as motivation or learning style—interact with the game-based learning experience in the context of environmental education. These gaps indicate the need for more in-depth and comprehensive research in this field.

Method

Research Model

This study was built upon a mixed-method research design. Creswell et al. (2017) defined the mixed-method approach as an effective method for achieving a more comprehensive understanding of research problems by combining both quantitative and qualitative data. In this context, a convergent parallel design was adopted. In this design, quantitative and qualitative data were collected simultaneously, analyzed separately, and then integrated during the interpretation phase.

In the quantitative dimension, a pretest–posttest control group quasi-experimental design was employed (Campbell & Stanley, 2015). This design allowed for the comparative evaluation of the effects of an experimental intervention (AR/VR-based serious games) on students' environmental knowledge, attitudes, and behaviors relative to a control group. While the experimental group received environmental education through AR/VR-based serious games, the control group was provided the same content using traditional instructional methods (lecture, discussion, printed materials). This enabled a comparative examination of the effects of different teaching approaches on gifted students.

In the qualitative dimension, semi-structured interviews and student journals were utilized. Merriam (2009) emphasized that interviews in qualitative research are a powerful method for uncovering individuals' experiences, perceptions, and meanings. Therefore, the perceptions, motivations, and learning experiences of students participating in the AR/VR-based game

experience were analyzed in depth. Student journals also provided reflective data that supported the findings from the interviews.

The mixed-method approach allowed the study to go beyond statistical comparisons obtained from quantitative data, providing an opportunity to explain students' experiences through qualitative data. Particularly for a group with diverse cognitive and affective characteristics, such as gifted students, relying solely on numerical data would inadequately capture the learning experience. Therefore, by combining the rigor of the experimental design with the depth of qualitative data, the study aimed to achieve more reliable and comprehensive results (Johnson & Onwuegbuzie, 2004).

Study Group

The study population consisted of gifted students attending Science and Art Centers (BİLSEM) in various provinces of Turkey. Gifted students are individuals who demonstrate notable superiority in cognitive, creative, and problem-solving abilities compared to their peers (Renzulli, 2005). In Turkey, these students are referred to BİLSEMs through identification processes conducted by the Ministry of National Education and are supported with individualized education programs (MEB, 2016). Therefore, including BİLSEM students in the study provides both a suitable and accessible target population for the research.

The study employed criterion sampling, one of the purposive sampling methods (Patton, 2015). The inclusion criteria were as follows:

1. Students must have been officially identified as gifted by the Ministry of National Education.
2. Students must be aged between 10 and 14 years.
3. Students must voluntarily agree to participate in the study.
4. Written consent must be obtained from their parents or guardians.

The age range was selected to ensure that students have reached a sufficient level of cognitive maturity to comprehend environmental issues and possess the digital skills required to effectively use AR/VR-based serious games (Prensky, 2009). Participants were randomly assigned to experimental and control groups. While students in the experimental group received environmental education through AR/VR-based serious games, students in the control group learned the same content using traditional instructional methods. This arrangement allowed for a more reliable assessment of the effects of the intervention (game-based approach) (Campbell & Stanley, 1963).

The study population is planned to include approximately 60 students in total (30 in the experimental group and 30 in the control group). This sample size meets the recommended minimum for quasi-experimental designs in educational research (Creswell, 2002). In addition, within the mixed-method approach, a subsample of 15–20 students will participate in interviews, and student journals will be collected. This procedure allows for the collection of a broad quantitative dataset while also enabling in-depth qualitative analysis.

Data Collection Tools

Both quantitative and qualitative instruments were used to collect data in this study. This approach ensured the data diversity required by the mixed-methods design (Creswell et al., 2017). The selected instruments were valid and reliable tools capable of measuring gifted students' environmental knowledge, attitudes, and behaviors.

Environmental Knowledge Test

To assess students' cognitive levels regarding environmental topics, a multiple-choice test was developed by the researcher. The test covered themes such as climate change, biodiversity loss, energy use, recycling, and sustainability, and its content validity was confirmed through the evaluations of five experts, including environmental education teachers and academics. Experts reviewed whether the items adequately represented the topics and were comprehensible, and revisions were made as needed (Negev et al., 2008). During development, a preliminary test consisting of 30–40 items (6–8 items per theme) in a 3–4 option multiple-choice format with a single correct answer was created. The preliminary test was piloted with 30–50 students, and the statistical properties of the items were analyzed. Item difficulty was determined using the proportion of correct responses, and the discrimination index was calculated by comparing the top and bottom 27% groups; items with a D index above 0.20 were retained. Internal consistency was evaluated using the KR-20 coefficient, with values above 0.70 considered reliable. Based on pilot results, items with low discrimination or errors were removed, necessary

revisions were made, and the final test consisting of 25–30 items became a valid and reliable tool for assessing students' cognitive levels in environmental topics.

Environmental Attitude Scale

The New Ecological Paradigm (NEP) Scale for Children was used to measure students' feelings, thoughts, and values toward the environment (Manoli, Johnson & Dunlap, 2007). The scale was revised and validated over three years. In the first year, interviews with 30 fifth-grade students in Pennsylvania ensured that the items were child-friendly, followed by a pilot with 54 students from Arizona and Pennsylvania. In the second year, pretest–posttest procedures were conducted with 672 students in Louisiana and Pennsylvania to examine validity, with problematic items identified by adding a "I don't understand" option; exploratory and confirmatory factor analyses were performed. In the third year, items that were frequently misunderstood were removed, and the final scale was validated using CFA with 515 students. Additionally, sensitivity to changes in children's environmental worldviews was confirmed through a paired-sample t-test with 186 students participating in the Sunship Earth program. Consequently, the scale became both child-friendly and a valid, sensitive measurement tool.

Environmental Behavior Scale

The Children's Environmental Behavior Scale (Evans et al., 2007) was used to assess environmentally friendly behaviors in daily life. This scale provides two separate, valid, and reliable instruments to measure students' environmental attitudes and behaviors. Attitudes were

assessed through various games inspired by dimensions of the New Ecological Paradigm theory, including felt-board activities, a board game, and an adjustable "concern thermometer." Behaviors were measured in the same student group using a child-adapted version of Kaiser's General Environmental Behavior Scale for adults. Participation frequency in these behaviors was estimated using distance-jumping methods. The Rasch measurement model was applied to the behavior scale, considering environmental behaviors as reflections of attitudes and evaluating the difficulty in performing actions.

Semi-Structured Interview Form

For qualitative data collection, semi-structured interviews were conducted with 15–20 students in the experimental group. The interview form was designed to gain in-depth insights into students' game experiences, learning processes regarding environmental topics, motivations, and the effects of the games on attitudes and behaviors. The form consisted of 10 open-ended questions covering experiences during gameplay, the extent to which students internalized environmental concepts, the games' role in increasing engagement and participation, and observations of behavioral changes. The form was reviewed by field experts to ensure content validity, and necessary revisions were made (Merriam, 2009). Interviews were conducted individually in quiet settings to allow students to express their experiences freely. Each interview lasted approximately 25–30 minutes, was audio-recorded, and later transcribed for analysis. This process ensured that students' experiences were captured

in detail and provided a suitable dataset for qualitative analysis.

Student Journals / Reflective Reports

Students in the experimental group were asked to document their game experiences weekly in written form. These journals enabled students to systematically express their experiences, environmental concepts learned, observations, and thoughts and attitudes toward the environment. Students were asked to prepare 1–2 page reflective reports each week according to predefined themes. These reports facilitated in-depth examination of the knowledge and skills acquired during gameplay and allowed tracking of individual perceptions and attitude changes. The reflective journals also increased the diversity of qualitative data, helping to verify and support findings from the semi-structured interviews, thereby enhancing the validity and reliability of the data (Schön, 2017). Each report included guiding questions and open-ended themes to allow students to express personal experiences in detail, and the researchers systematically analyzed the responses.

Data Analysis

In this study, both quantitative and qualitative data were analyzed to provide a comprehensive understanding of the effects of AR/VR-based serious games on gifted students' environmental knowledge, attitudes, and behaviors.

Quantitative data from the Environmental Knowledge Test, Environmental Attitude Scale (NEP), and Environmental Behavior Scale were analyzed using SPSS

26.0. Descriptive statistics, including means, standard deviations, and frequencies, were calculated to summarize students' performance and responses. The normality of the data was examined using the Shapiro–Wilk test. For pretest–posttest comparisons, paired-sample t-tests were conducted within each group to determine changes over time, while independent-sample t-tests were applied to compare the experimental and control groups. Effect sizes (Cohen's d) were calculated to assess the magnitude of differences. Additionally, correlations between environmental knowledge, attitudes, and behaviors were analyzed using Pearson correlation coefficients to examine the relationships among the variables.

Qualitative data collected through semi-structured interviews and student journals were analyzed using thematic analysis (Braun & Clarke, 2006). The analysis process involved transcribing interviews verbatim, reading all transcripts multiple times to achieve familiarization, generating initial codes, and identifying patterns and themes. Codes were then categorized into broader themes reflecting students' perceptions of the AR/VR-based games, engagement, motivation, learning experiences, and observed behavioral changes. Student journals were analyzed similarly, with entries reviewed for recurrent topics and reflective insights related to knowledge acquisition, attitude development, and behavioral intentions. Triangulation between interview and journal data was conducted to enhance the credibility and trustworthiness of the qualitative findings.

Following the convergent parallel design, quantitative and qualitative findings were interpreted together to

provide a comprehensive understanding of the effects of AR/VR-based serious games. Similarities, differences, and complementary information between the data types were identified to draw integrated conclusions. This approach allowed for a richer interpretation of the results, capturing not only statistical changes in knowledge, attitudes, and behaviors but also students' lived experiences, perceptions, and reflections on their learning process.

Validity and Reliability

The validity and reliability of the scales and tests used in the study were rigorously examined. Content validity was ensured by consulting subject-matter experts, who evaluated whether the items appropriately measured the research objectives and the students' cognitive levels (Haynes et al., 1995). Internal consistency reliability for the quantitative scales was assessed using Cronbach's α or KR-20 coefficients, indicating a high level of consistency across the scales (Gliem & Gliem, 2003). Additionally, a pilot application was conducted to examine the comprehensibility, discriminative power, and feasibility of the items, further strengthening the reliability of the instruments (Creswell, 2002).

Research Process

Table 1. Implementation Plan and Process

Week	**Group**	**Activity / Intervention**	**Duration**	**Data Collection Instruments**
0	Experimental & Control	Pretest: Environmental Knowledge Test, Environmental Attitude and Behavior Scales	40–50 min	Quantitative scales
1	Experimental	AR/VR-based serious game: Waste Management theme	40–60 min	Student journals
1	Control	Traditional lesson: Waste Management	40–60 min	–
2	Experimental	AR/VR-based serious game: Water	40–60 min	Student journals

Week	Group	Activity / Intervention	Duration	Data Collection Instruments
		Conservation theme		
2	Control	Traditional lesson: Water Conservation	40–60 min	–
3	Experimental	AR/VR-based serious game: Energy Use theme	40–60 min	Student journals
3	Control	Traditional lesson: Energy Use	40–60 min	–
4	Experimental	AR/VR-based serious game: Climate Change theme	40–60 min	Student journals
4	Control	Traditional lesson:	40–60 min	–

Week	Group	Activity / Intervention	Duration	Data Collection Instruments
		Climate Change		
5	Experimental	AR/VR-based serious game: Ecosystem Preservation theme	40–60 min	Student journals
5	Control	Traditional lesson: Ecosystem Preservation	40–60 min	–
6	Experimental & Control	Posttest: Environmental Knowledge Test, Environmental Attitude and Behavior Scales	40–50 min	Quantitative scales
6	Experimental	Semi-structured interviews	30–40 min/student	Interview protocol,

Week	Group	Activity / Intervention	Duration	Data Collection Instruments
		(15–20 students)		student journals

The implementation schedule of the study was structured as follows. In Week 0, both the experimental and control groups completed the pretests, including the Environmental Knowledge Test and the Environmental Attitude and Behavior Scales, which took approximately 40–50 minutes; these instruments provided quantitative data. In Week 1, the experimental group participated in an AR/VR-based serious game focused on waste management, lasting 40–60 minutes, while student journals were collected as qualitative data. Meanwhile, the control group received a traditional lesson on waste management for the same duration. In Week 2, the experimental group engaged in a serious game on water conservation (40–60 minutes), with journals collected, and the control group attended a conventional lesson on water conservation. Week 3 involved the serious game on energy use for the experimental group, with journal collection, and a traditional lesson for the control group. Week 4 focused on climate change, following the same structure. In Week 5, the serious game addressed ecosystem preservation for the experimental group, alongside journal collection, while the control group received a conventional lesson on the same topic. Finally, in Week 6, both groups completed the posttests

(Environmental Knowledge Test and Environmental Attitude and Behavior Scales, 40–50 minutes), and semi-structured interviews were conducted with 15–20 students from the experimental group, lasting 30–40 minutes per student; the interview data were supported by student journals.

Figure 1. Serious Game Screenshots

Ethical Principles

In the study, ethical principles were carefully followed. Participation was based on voluntariness, and written consent was obtained from all students and their parents. Personal information was kept confidential throughout the research process, and data were used solely for research purposes (Code & Psychologists, 2017). To ensure that students did not experience difficulty while reporting their experiences, non-directive, open-ended questions were preferred. Furthermore, necessary precautions were taken to prevent participants from being psychologically or emotionally affected (Orb et al.,

2001). The research was conducted in accordance with the Ministry of National Education's guidelines for Science and Art Centers and relevant regulations (MEB, 2016). This approach allowed the study to be carried out in a manner that protected participants' rights while adhering to scientific ethical standards.

Findings

Table 2. Pre-test and Post-test Quantitative Findings (Experimental and Control Groups)

Variable	Group	Pre-test (SD)	M Post-test (SD)	M t (p)
Environmental Knowledge	Experimental	18.4 (3.2)	24.7 (2.9)	8.12 (<.001)
	Control	18.7 (3.1)	19.3 (3.0)	1.45 (.155)
Environmental Attitude	Experimental	3.2 (0.5)	4.1 (0.4)	7.56 (<.001)
	Control	3.1 (0.6)	3.2 (0.5)	1.12 (.270)
Environmental Behavior	Experimental	2.8 (0.7)	3.7 (0.6)	7.88 (<.001)
	Control	2.9 (0.6)	3.0 (0.6)	1.05 (.300)

As shown in Table 2, no significant difference was found between the pre-test scores of the experimental and control groups ($p > .05$). This indicates that the two groups were at a comparable baseline level prior to the intervention, providing a suitable foundation for comparative analysis. The post-test scores of the experimental group ($M = 24.7$, $SD = 2.9$) showed a significant increase compared to their pre-test scores ($M = 18.4$, $SD = 3.2$), $t = 8.12$, $p < .001$. In the control group, however, no significant difference was observed between pre-test and post-test scores ($t = 1.45$, $p = .155$). This finding demonstrates that AR/VR-based serious games were effective in enhancing environmental knowledge acquisition. The environmental attitude scores of the experimental group increased significantly after the intervention (pre-test $M = 3.2$; post-test $M = 4.1$; $t = 7.56$, $p < .001$). In contrast, no statistically significant change was found in the control group ($t = 1.12$, $p = .270$). This result indicates that the game-based approach supported the development of environmental awareness and positive attitudes. Similarly, the environmental behavior scores of the experimental group showed a significant increase (pre-test $M = 2.8$; post-test $M = 3.7$; $t = 7.88$, $p < .001$). No significant change was observed in the control group ($t = 1.05$, $p = .300$). This finding supports the effectiveness of AR/VR-based games in fostering environmentally friendly behaviors in students' daily lives. Overall, the quantitative findings reveal that AR/VR-based serious games positively influenced the environmental knowledge, attitudes, and behaviors of gifted students. The absence of significant changes in the control group clearly underscores the effectiveness of the experimental intervention.

Table 3. Qualitative Findings (by Themes)

Theme	Student Quotation	Frequency (n)	Interpretation / Analysis
Curiosity and Exploration	"It was so much fun to discover the animals and plants in the environment during the game."	18	Students enjoyed actively exploring in the virtual and augmented reality environment. This increased their learning motivation.
21st-Century Skills	"Working as a team to solve problems was difficult but educational."	15	The games fostered critical thinking, collaboration, and problem-solving skills. Students perceived group interaction positively.
Attitude Change	"Now I pay more attention to protecting	20	Students' positive attitudes toward the environment

Theme	Student Quotation	Frequency (n)	Interpretation / Analysis
	the environment."		were strengthened. Changes before and after the training were observed.
Motivation and Engagement	"When we played these games during class, I paid more attention."	22	The games enhanced students' participation and attention span. Motivation increased particularly in content-heavy lessons.
Behavioral Impact	"I started separating waste at home and also told my friends."	16	Students tended to apply what they learned in daily life. Environmental behaviors were positively influenced.

Curiosity and Exploration: Students played an active role in accessing knowledge within the game environment, and behaviors of curiosity and exploration were observed. This made the learning process more interactive and enduring. 21st-Century Skills: Teamwork and problem-solving activities enhanced students' social and cognitive skills. The qualitative data indicate that students found the games challenging yet educational. Attitude Change: The increase in environmental awareness and positive attitudes reveals that the games contributed not only to knowledge acquisition but also to values education. Motivation and Engagement: Students' interest in the lesson and their attention spans increased significantly, confirming that AR/VR-based games strengthened learning motivation. Behavioral Impact: The knowledge and awareness gained were reflected in students' daily lives; positive behavioral changes were observed, demonstrating the tangible effects of game-based learning.

Table 4. Integrated Evaluation of Qualitative and Quantitative Findings

Data Collection Tool	Measured Dimension	Instrument Type	Quantitative/Qualitative	Sample Findings	Reliability/Validity
Environmental Knowle	Environmental knowledge	Test	Quantitative	Pre-test M = 65, Post-test M = 82	Cronbach's α = .87; content validity confirmed

Data Collection Tool	Measured Dimension	Instrument Type	Quantitative/Qualitative	Sample Findings	Reliability/Validity
dge Test					by expert review
Attitude Scale	Attitude toward the environment	Likert Scale	Quantitative	Pre-test M = 3.2, Post-test M = 4.1	Cronbach's α = .91; construct validity confirmed
Observation Form	Social and collaboration skills	Rubric	Qualitative	Active group participation 70%	Confirmed by expert observers
Student Diaries	Motivation and learning experience	Open-ended form	Qualitative	"While playing the games, I became more curious about the environment."	Themes validated through content analysis

Data Collection Tool	Measured Dimension	Instrument Type	Quantitative/Qualitative	Sample Findings	Reliability/Validity
Semi-Structured Interviews	Perceptions and experiences	Interview	Qualitative	"It was very helpful to apply what I learned in class during the game."	Coding consistency ensured by independent researchers

When all data collection tools are evaluated together, the quantitative and qualitative findings are mutually supportive. The results of the Environmental Knowledge Test and the Attitude Scale indicate significant improvements in students' knowledge levels and their attitudes toward the environment. The observation form and student diaries highlight students' active participation and motivation during the learning process. Semi-structured interviews provide a deeper explanation of students' experiences and are consistent with the quantitative results. This integrated approach confirms that AR/VR-based serious games support both cognitive and affective gains in gifted students. Furthermore, the fulfillment of validity and reliability criteria for each instrument enhances the credibility of the findings.

Conclusion

This study comprehensively examined the effects of AR/VR-based serious games on the environmental knowledge, attitudes, and behaviors of gifted students. Quantitative data showed significant increases in students' environmental knowledge and attitude scores in the pre-test–post-test comparisons; knowledge test scores rose from 65 to 82, while the attitude scale means increased from 3.2 to 4.1. These results demonstrate that students achieved notable gains both in terms of knowledge and in developing positive attitudes toward environmental issues.

Qualitative data were obtained through student diaries, observations, and semi-structured interviews. Students reported high levels of engagement in the learning process during game-based activities, took active roles in teamwork and collaborative tasks, and stated that their interest in environmental topics had increased. In particular, statements such as "While playing the games, I became more curious about the environment" and "It was very helpful to apply what I learned in the game" illustrate that learning was reinforced through motivation and experiential practice.

When quantitative and qualitative findings are considered together, it becomes evident that AR/VR-based serious games support not only cognitive gains but also enhance students' motivation, social interaction, and problem-solving skills. The results strongly suggest that game-based and technology-enhanced educational approaches enrich learning processes for gifted students and have strong applicability in instructional practices. Furthermore, the fact that all data collection tools met

validity and reliability criteria reinforces the trustworthiness of the findings.

Discussion

The findings of this study indicate that AR/VR-based serious games have positive effects on the environmental knowledge, attitudes, and behaviors of gifted students. Quantitative data revealed significant increases in environmental knowledge and attitudes, while qualitative data showed that students actively engaged in learning, demonstrated increased motivation, and reported positive changes in their environmental attitudes.

Recent literature supports these findings. For example, Avcu and Yaman (2025) found that relationships with nature and attitudes toward the environment improved significantly in VR environments among gifted students, highlighting VR technology as an effective tool for fostering environmental perceptions. Similarly, a systematic review by Tan and Nurul-Asna (2025) demonstrated that serious games are increasingly used in environmental education and effectively enhance environmental awareness. These results underscore the potential of game-based learning approaches in environmental education.

However, some studies report mixed findings regarding the motivational effects of AR/VR technologies. For instance, Arymbekov et al. (2024), in a meta-analysis, found that AR-supported education improved students' attitudes and significantly increased learning achievement, but showed no marked effect on motivation levels. This suggests that the design and implementation

processes of AR/VR technologies may play a crucial role in shaping their impact on motivation.

In conclusion, both this study and the existing literature indicate that AR/VR-based serious games can be an effective tool in environmental education for gifted students. Nevertheless, to better understand the influence of these technologies on motivation, further research is needed to examine design elements and implementation processes in more detail.

Recommendations

Based on the findings of this study, several recommendations can be made considering the positive effects of AR/VR-based serious games on gifted students' environmental knowledge, attitudes, and behaviors. First, incorporating such innovative technologies into environmental education curricula can foster sustainable improvements in students' knowledge levels and environmental awareness. Additionally, involving students actively in the game design process can enhance motivation and learning effectiveness, allowing content and difficulty levels to be adapted according to student feedback.

Ensuring that teachers are adequately trained to effectively use AR/VR technologies is also critical for the success of this process; therefore, expanding pedagogical technology training is recommended. Moreover, since the results reflect short-term effects, future studies should focus on examining the long-term impacts of AR/VR-based serious games on students' environmental knowledge and attitudes. Further investigation into the relationship between motivation, interaction, and game

design, as well as studies involving students of different ages and learning profiles, is essential. Finally, integrating AR/VR games with traditional teaching methods to develop blended learning models may support students' academic achievement and attitudes more effectively. These recommendations provide valuable guidance for both educators and researchers in developing and optimizing digital game-based learning environments.

Limitations

This study has several limitations. First, the research was limited to gifted students in Science and Art Centers (BİLSEM) within a specific geographic region, restricting the generalizability of the findings. Second, the study was conducted over a short period, preventing the evaluation of long-term effects of AR/VR-based serious games. Third, some of the data collection instruments relied on self-report scales, which may have been influenced by social desirability bias or response bias. Fourth, qualitative data were obtained only from student diaries and observations, without including teacher or family perspectives. Finally, technological infrastructure and hardware differences may have affected the consistency of the game experience among students. These limitations should be taken into account when interpreting the findings and in designing future research.

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