TRULY MISUNDERSTOOD GENIUSES? A MULTIDIMENSIONAL ANALYSIS OF GIFTEDNESS, TWICE-EXCEPTIONAL PROFILES, AND INCLUSIVE EDUCATIONAL APPROACHES BASED ON UDL

GENI REALMENTE INCOMPRESI? UN'ANALISI MULTIDIMENSIONALE DELLA PLUSDOTAZIONE, DEI PROFILI TWICE EXCEPTIONAL E DEGLI APPROCCI EDUCATIVI INCLUSIVI BASATI SULL'UDL

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ABSTRACT
The article examines the phenomenon of giftedness and twice-exceptional profiles by considering neurobiological, psychological, and pedagogical perspectives. Through a critical review of recent literature, it offers an integrated overview of the characteristics of these students and their educational needs, with particular attention to the application of the Universal Design for Learning model as an inclusive educational approach capable of addressing the diverse needs of gifted and twice-exceptional learners.

L'articolo analizza il fenomeno della plusdotazione e dei profili twice exceptional considerando gli aspetti neurobiologici, psicologici e pedagogici. Attraverso una revisione critica della letteratura recente, offre una panoramica integrata delle caratteristiche di questi studenti e dei loro bisogni educativi, con particolare attenzione all'applicazione del modello Universal Design for Learning come approccio educativo inclusivo in grado di rispondere alle esigenze differenziate degli studenti gifted e twice exceptional.

KEYWORDS
Giftedness, twice exceptionality, Universal Design for Learning
Plusdotazione, Doppia eccezionalità, Universal Design for learning

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Introduction

Giftedness represents a multifaceted construct encompassing exceptional cognitive abilities and a wide range of emotional, behavioural, and developmental characteristics. Far from being a homogeneous category, gifted individuals exhibit diverse profiles that challenge traditional educational and psychological frameworks. Among these, the population of twice-exceptional (2e) individuals, those who are both gifted and have one or more neurodevelopmental disorders, poses unique challenges for assessment and support. The coexistence of high intellectual potential and learning difficulties requires an integrated understanding of neurobiological, psychological, and pedagogical dimensions.

This article aims to provide a critical and up-to-date synthesis of the current scientific literature on giftedness and twice-exceptionality, exploring their neural underpinnings, cognitive-emotional profiles, and implications for educational practice. Particular attention is given to the Universal Design for Learning (UDL) model to respond more effectively to the complex and heterogeneous needs of gifted and twice-exceptional learners.

1. Defining a Complex Construct

Giftedness remains a relatively underexplored and often misunderstood topic, making its assessment particularly challenging. It is most recognised during the school years, when students are required to apply their talents, an expectation that reveals marked differences in those with high intellectual potential compared to their peers. No universally accepted definition of giftedness exists in the scientific literature (Cross & Cross, 2005; Sternberg & Davidson, 2005; Dai, 2010). Conceptualisations of giftedness range from conservative views, which identify gifted children based on high intellectual abilities as measured by cognitive assessments or IQ tests, to more liberal or multicategory models. These broader perspectives criticise the unidimensional view of intelligence and emphasise other traits such as creativity, leadership, and artistic skills (Murphy & Walker, 2015).

In traditional frameworks, giftedness is typically considered an innate and stable trait manifesting across all areas of intellectual development and measurable through standardised IQ tests (Gagné, 2008). Intellectual giftedness is commonly assessed using standardised intelligence tests, such as the Wechsler Scales (WPPSI, WISC, WAIS), which provide a dimension of an individual's IQ. Within this framework, intelligence is defined as a set of cognitive abilities related to planning, learning speed, reasoning, problem-solving, and understanding complex ideas (Gottfredson, 1997). The term “high intelligence” or “high intellectual potential” is usually assigned to individuals who score at least two standard deviations above the mean on IQ assessments (Boschi et al., 2016).

Recently, many definitions have moved beyond the sole reliance on IQ, highlighting the importance of context and integrating environmental and personal factors such as motivation, effort, and creativity (Sartori & Cinque, 2019). Giftedness is thus viewed as a potentiality that requires appropriate support and development, both in the private and educational spheres, through tailored interventions based on the individual’s characteristics (Novello, 2020). According to Renzulli (2011), giftedness emerges from the interaction of three core clusters: above-average ability, task commitment, and creativity. A gifted individual demonstrates exceptional performance in one or more specific domains, which may include academic fields or cross-disciplinary competencies.

Similarly, Heller et al. (2005) propose a model where giftedness arises from a network of relatively independent “talent” factors, such as intelligence, creativity, social competence, musical ability, artistic talent, psychomotor skills, and practical intelligence. The expression of these talents is moderated by non-cognitive personality traits (e.g., achievement motivation, resilience, curiosity, stress management) and socio-environmental conditions (e.g., parenting style, parental expectations, societal reactions, family climate, school environment, quality of education, and critical life events).

Many studies recognise creativity as a key component of the complex phenomenon of giftedness. Individuals with high cognitive potential often process information in distinctive ways using analogical, divergent, or “tree-like” thinking. This is expressed through their ability to generate alternative, original, and innovative solutions to problems (Sartori & Cinque, 2019). Creativity is also included in one of the most widely accepted definitions of giftedness: gifted children are those who demonstrate, or have the potential to demonstrate, outstanding performance compared to their peers in one or more of the following areas, general intellectual ability, specific academic aptitude, creative thinking, leadership, and the visual and performing arts (National Association for Gifted Children, 2020).

Another significant definition was proposed by the Columbus Group in 1991: “*Giftedness is asynchronous development in which advanced cognitive abilities and heightened intensity combine to create inner experiences and awareness that are qualitatively different from the norm. This asynchrony increases with higher intellectual capacity. The uniqueness of the gifted renders them particularly* *vulnerable and requires modifications in parenting, teaching, and counselling for them to develop optimally*" (AISTAP, p. 3). As Roncoroni (2018) notes, this definition captures key concepts that characterise gifted individuals: advanced cognitive skills, psychological vulnerability resulting from a unique way of perceiving the world, and asynchronous development that reflects the coexistence of high intellectual ability with limited life experience.

In line with these perspectives, our theoretical framework assumes that giftedness is a complex, multicomponent construct that should not be reduced to or equated with IQ, which is merely an indicator of its possible presence. International studies have identified a series of recurring, though not universally present, traits in gifted children and adolescents. One crucial feature is the atypical functioning of their intellect, which relies on cognitive resources and neural mechanisms that deviate from the norm and show distinctive patterns of brain organisation (Siaud-Facchin, 2016).

Commonly observed traits include: advanced language skills, a richer vocabulary than age peers, accelerated learning in specific areas, excellent memory, intense curiosity, leadership tendencies, nuanced understanding of meaning and abstract concepts, rapid information processing, early use of complex thinking strategies, a deep desire to explore topics in depth, an ability to perceive relationships others may miss, capacity to transfer learning methods and concepts, generation of creative and original ideas, interests more aligned with adolescents or adults, intuitive understanding of concepts, strong abstract reasoning and problem-solving abilities, high intrinsic motivation to learn, greater emotional sensitivity and intensity, perfectionism, developmental asynchrony, and uneven growth across physical, mental, social, and behavioural domains (Renzulli & Reis, 1994; Sternberg, 2005; Webb & Gore, 2012; Kaufman, Plucker, & Russell, 2012; Galbraith & Delisle, 2015; Leavitt, 2017).

Additionally, these individuals often show discrepancies between cognitive and emotional development (Lanfranchi, 2020), heightened vulnerability to psychopathology (Cinque & Sartori, 2019), family and school-related difficulties, emotional regulation challenges (LabTalent, 2014), and academic underachievement (Alesi, 2020).

2. The Neurobiological Characteristics of Gifted Individuals: Resources, Vulnerabilities, and Educational Implications

Cognitive giftedness represents an area of growing interest in contemporary neuroscience, as individuals with significantly above-average cognitive abilities display distinct neurobiological features that diverge from typical brain development trajectories. Recent advances in cognitive neuroscience, structural and functional neuroimaging, behavioural genetics, and neurophysiology have contributed to an increasingly nuanced understanding of the cerebral and genetic underpinnings of high intellectual potential (Kuznetsova et al., 2024).

From a morphological perspective, numerous MRI studies have reported increased volumetric development in critical brain regions of gifted individuals, including the dorsolateral prefrontal cortex, inferior parietal lobule, and superior temporal gyrus—areas associated with high-level cognitive functions such as working memory, language, planning, and abstract reasoning (Kuznetsova et al., 2024). White matter also shows enhanced structural integrity, particularly in the corpus callosum and inferior front-occipital fasciculi, facilitating more efficient synaptic transmission and faster information processing (Jung & Haier, 2007).

Functionally, a heightened communication between front-parietal regions has been observed, consistent with the Parieto-Frontal Integration Theory (P-FIT), which identifies these regions as central hubs of complex cognition (Jung & Haier, 2007). Moreover, fMRI studies reveal greater synergy between the Default Mode Network (DMN), involved in introspective and creative processes, and the Executive Control Network (ECN), responsible for executive regulation (Lardoeyt et al., 2020; Sun et al., 2022). This dynamic interaction—typically antagonistic—suggests an exceptional capacity in gifted individuals to integrate mental flexibility with cognitive control, fostering metacognition, creativity, and divergent thinking (Uddin et al., 2011).

Neurophysiological data further corroborate the picture of neural efficiency. EEG studies have shown increased coherence in alpha and gamma bands during cognitive tasks, indicating more effective interhemispheric synchronisation (Jauk et al., 2012). Enhanced gamma activity in front-parietal regions is interpreted as a marker of more efficient multisensory integration and rapid cognitive processing (Kuznetsova et al., 2024). Similarly, magnetoencephalography (MEG) confirms increased brain activation during complex and creative tasks (Jauk & Benedek, 2014).

Brain development in gifted individuals follows atypical trajectories: the prefrontal cortex displays a slower yet prolonged maturation process, suggesting an extended window of neural plasticity, greater cognitive adaptability, and a predisposition toward abstract learning (Shaw et al., 2006). The pronounced individual variability in activation patterns also points to a flexible brain organisation, less constrained by rigid strategies (Christodoulou et al., 2013).

Genetic studies support the multifactorial origin of intelligence. Projects such as the GIP (Genetics of Intellectual Potential) have identified genetic variants related to synaptic development, myelination, and neural plasticity. Prenatal environmental factors and hormonal exposures, such as testosterone, are also hypothesised to influence brain lateralisation (Baron-Cohen et al., 2005). Epigenetic mechanisms further suggest that early environmental input can modulate gene expression and the manifestation of cognitive talent (Gottlieb, 2007).

The academic performance of gifted children often reflects this complex neurobiological profile. A systematic review involving over 77,000 participants (ages 5–18) highlighted superior abilities in verbal working memory, inhibition, attentional flexibility, geometric problem-solving, and rapid information processing. Gifted individuals also score higher on intrinsic motivation, self-efficacy, and openness to experience, contributing to deeper and more strategic learning (Kuznetsova et al., 2024).

Despite these advantages, cognitive giftedness does not guarantee academic or adaptive success. The asynchrony between advanced cognitive development and emotional maturation can challenge traditional school routines, leading to oppositional behaviours, performance anxiety, or social withdrawal (Silverman, 2013). Gifted children often exhibit heightened emotional sensitivity and intense responsiveness to stimuli, described by Dabrowski’s concept of "overexcitability," which encompasses five domains: psychomotor, sensory, intellectual, imaginative, and emotional. Intellectual overexcitability is a hallmark trait in gifted individuals and may contribute to emotional intensity and socio-relational vulnerabilities (Vuyk et al., 2016).

Recent studies have also reported higher incidences of internalising disorders such as anxiety and depression, as well as externalising conditions like hyperactivity and oppositional behaviours among gifted individuals. A significant discrepancy between verbal and performance abilities has been linked to increased behavioural difficulties and mixed symptom profiles (Tasca et al., 2022). Furthermore, if adequate stimulation or personalised teaching strategies are lacking, gifted individuals may experience disengagement, boredom, and underachievement (Reis & McCoach, 2000).

Considering this evidence, adopting educational approaches that recognise and nurture the neuropsychological specificities of gifted learners is essential. Their characteristics, neural efficiency, optimised functional connectivity, and advanced metacognitive processes, constitute valuable assets for academic learning, especially in activities requiring working memory, selective attention, abstract reasoning, and multisensory integration (Jung & Haier, 2007; Jauk et al., 2012). The functional interplay between the DMN and ECN, balancing creative reflection and focused execution, supports the development of self-regulation, autonomy in learning, and conceptual depth (Hearne et al., 2016; Uddin et al., 2011).

However, enabling gifted individuals to fully realise their potential requires a school environment capable of identifying, understanding, and addressing their unique needs. An effective educational context for gifted learners must be flexible, inclusive, and stimulating, offering appropriate challenges, fostering creativity, and supporting socio-emotional development. Only through an integrated and multidimensional approach can educational and social maladjustment be prevented, thereby promoting the harmonious development of cognitive and emotional competencies in these exceptional individuals.

3. Twice-Exceptionality and its educational implications

The term “twice-exceptional” refers to individuals who exhibit both giftedness and a co-occurring disorder in other domains (Crepeau-Hobson & Bianco, 2013). Twice-exceptional (2e) individuals show promise for exceptional performance or creativity in areas such as mathematics, science, technology, the arts (whether visual, spatial, performing, or social), or other domains of human endeavor, while meeting the criteria for one or more disorders as defined by national guidelines (Reis et al., 2014). It means that a gifted cognitive profile coexists with a learning, emotional, physical, sensory, or developmental disorder. This may include autism or Asperger’s syndrome, attention-deficit/hyperactivity disorder (ADHD), learning difficulties, sensorimotor disorders, socio-emotional impairments or others (Gierczyk & Hornby, 2021). 2e individuals embody a striking paradox: they may exhibit high-level abilities in areas such as problem-solving, motivation, or creativity, while simultaneously facing significant learning challenges. Many of these learners, particularly those with diagnosed learning disabilities, display a deep curiosity and an insightful grasp of complex concepts (Nielson, 2002). Yet, despite these strengths, they often exhibit behaviours that interfere with academic success and complicate their identification for gifted programs. This asynchronous development, where advanced skills in some domains coexist with substantial difficulties in others, creates unique educational challenges (Crepeau-Hobson & Bianco, 2013). As Maddocks (2020) notes, 2e students typically show greater variability in cognitive and academic performance, with more pronounced gaps between strengths and weaknesses than their peers who are either solely gifted or of average ability. Research has shown that students identified as 2e with learning disorders may perform comparably to their average-ability peers in areas such as short-term working memory, auditory processing, and long-term retrieval (Cody et al., 2022). However, they tend to score lower than their peers on tasks involving processing speed across cognitive and achievement assessments. This variability underscores the complexity of their profiles, where two coexisting conditions are observed within the same developmental profile, both critical in shaping the individual's developmental outcomes. Although pedagogical research has shaped the field of twice-exceptionality (Foley-Nicpon et al., 2013), efforts to define the cognitive and psychological profiles of 2e students remain limited. Some studies highlighted the complex nature of these profiles, marking strengths in certain cognitive domains alongside specific areas of difficulty (Budding & Chidekel, 2012; Maddocks, 2019; Cain et al., 2019). Theories such as Gardner’s multiple intelligences and Sternberg’s triarchic model offer interpretive frameworks for understanding these patterns of uneven development (Gardner, 1983; Sternberg, 1985). However, there is still a notable lack of attention to the neurological mechanisms that may underlie these characteristics, leaving a significant gap in understanding the brain-based foundations of twice-exceptionality (Kelvington et al., 2022). Neurobiological research suggests that this duality may arise from imbalances across different brain circuits, where some functions are enhanced while others are disrupted (Kelvington et al., 2022). For instance, certain 2e learners may show remarkable memory performance, supported by efficient hippocampal function, while experiencing difficulties in motivation or social cognition, which may be linked to dysfunctions in basal ganglia circuits. A key underlying mechanism is neuroplasticity, the brain’s ability to adapt structurally and functionally in response to experience. This plasticity is mediated through complex molecular signalling between the synapse and the nucleus, involving genes that regulate learning and memory (Takeuchi et al., 2014). Importantly, dysregulation of these plasticity mechanisms has been associated with both cognitive enhancements and neurodevelopmental disorders such as autism spectrum disorder (Bourgeron, 2015; Hansel, 2019). Epigenetic processes, such as histone modifications and DNA methylation, also play a central role by influencing gene expression critical to memory formation and circuit function. Disruptions in these mechanisms have been linked to exceptional ability and disorders, depending on which neural system is affected (Gräff & Tsai, 2013; De Rubeis et al., 2014). Afterwards, the same molecular and cellular processes may contribute to heightened ability and significant challenges, depending on their expression across brain regions. Understanding this complexity is essential for supporting 2e learners in a more nuanced and scientifically grounded way (Kelvington et al., 2022).

This situation entails specific support needs and calls for individualised educational interventions, as both aspects significantly influence the person's learning and developmental trajectory. It is important to provide a wide spectrum of tailored educational support, along with fostering greater awareness among educators (Baum et al., 2017). Unfortunately, instructional focus often remains on these students' difficulties, while their cognitive and academic strengths are frequently overlooked. 2e learners face notable challenges in identification and support as traditional identification methods and pedagogical approaches frequently do not accommodate the intricacies of twice-exceptional profiles, leading to underrepresentation and misplacement within educational settings. The interaction of their strengths and challenges points to the necessity for educational frameworks that can recognise their distinctive needs while fostering their talents. Unfortunately, a recent systematic review examined the impact of school inclusion on gifted students, concluding that the use of this framework for talent development is still in an early, embryonic stage (Marsili et al., 2023). One of the most critical obstacles is the masking effect, which often results in misdiagnosis or failure to recognise twice-exceptionality. This significantly complicates students' educational experiences and restricts access to appropriate support (Baum et al., 2021).

Educational frameworks that are predominantly deficit-oriented tend to focus on remediating weaknesses rather than fostering the exceptional abilities that many 2e students possess. Consequently, their holistic development is often neglected, and their talents remain untapped (Gierczyk & Hornby, 2021). The use of inconsistent and non-standardised identification practices further widens disparities in access to advanced programs (Trail, 2022). These gaps call for a more equitable and systematic approach to both identification and intervention.

An effective approach to understanding twice-exceptional learners requires comprehensive, multidimensional assessment protocols. These protocols must integrate both strength-based and needs-based perspectives to encompass the dual aspects of their profiles. Ignoring either dimension risks perpetuating misdiagnosis or inadequate support (Baum et al., 2021; Trail, 2022). Assessments should incorporate qualitative data, such as teacher observations and interviews with families, alongside quantitative measures, such as nonverbal intelligence testing and neuropsychological evaluations. Such methods ensure a balanced view, capturing the multifaceted nature of these learners (Baum et al., 2021). When combined with diagnostics for learning or behavioural challenges, strength-based models that emphasise areas of advanced performance or creativity present a more nuanced framework. This dual focus prevents the exclusion of either giftedness or disorder, fostering better long-term outcomes (Trail, 2022). Individualised educational planning rooted in these assessment practices has been shown to yield positive results for both academic performance and socio-emotional well-being in twice-exceptional learners (Baum et al., 2021). In many cases, failure to adopt comprehensive evaluation frameworks leads to "either/or" categorisations. Such binary placements often result in students being assigned to either special education or gifted programming without accommodations for their dual needs, undermining principles of educational equity (Trail, 2022). Collaborative efforts involving multidisciplinary teams, including psychologists, educators, and families, are essential to creating adaptive instructional strategies. These teams enable nuanced understandings of learner profiles and contribute to the design of more inclusive educational practices (Kircher-Morris, 2024). Teacher attitudes and preparedness remain pivotal factors in the successful identification and support of twice-exceptional students (Giuliani & Treglia, 2024). Research indicates that many educators prioritise remedying deficits, even when evidence demonstrates that talent-focused approaches and positive educator-student relationships significantly improve both academic performance and emotional well-being (Gierczyk & Hornby, 2021; Baum et al., 2021). Individualised strategies tailored to improve organisation and working memory are essential for supporting twice-exceptional learners in achieving their potential (Kircher-Morris, 2024). Lessons explicitly addressing neurodiversity in classrooms can improve school climates by reducing stigma and encouraging inclusivity (Kircher-Morris, 2024).

4. Educational Approaches for Gifted and 2e grounded in Universal Design for Learning (UDL)

The approaches adopted in schools and educational settings largely reflect the underlying conceptual framework through which giftedness and twice-exceptionality are defined; however, the current landscape is characterised by a plurality of perspectives that are often fragmented and lack theoretical integration (Treglia & Giuliani, 2024).

Across OECD countries, definitions and educational responses to giftedness vary significantly, reflecting differing cultural and policy frameworks. Despite this variability, a shift toward more inclusive and holistic definitions of giftedness is evident internationally, where potential alone is not deemed sufficient without environmental and personal support (Freeman, 2015). The Council of Europe, through Recommendation No. 1248/1994, has formally recognised the need to address the specific educational needs of gifted learners.

In Italy, in 2019 did the Ministry of Education formally acknowledge gifted learners as potentially requiring SEN support (Note No. 562, April 2019). While this represents a significant institutional step, limitations remain: no specific implementation guidelines are provided, and teacher teams, often lacking training in gifted education, are responsible for adapting methodologies (Cinque & Sartori, 2019). Moreover, interventions are frequently justified only in response to difficulties, rather than proactively fostering potential. To advance inclusive education, there is a pressing need for improved teacher training and policy clarity (Canevaro et al., 2011; Chiappetta Cajola & Ciriaci, 2013).

The Universal Design for Learning (UDL) framework, guided by principles of flexibility and inclusivity, provides a promising approach to meet the needs of gifted and 2e learners. By incorporating multimodal teaching strategies and tiered supports, UDL enables educators to address strengths and needs dynamically (Godwin, 2018; Council for Exceptional Children, 2024; Fornauf & Erickson, 2018).

Universal Design for Learning (UDL) is a research-based educational framework that aims to optimise teaching and learning for all individuals by proactively designing learning experiences that accommodate variability in learners. One of the main goals of UDL is to reduce barriers and change the design of the learning environment (rather than "fixing" the learner), so that every student can engage in rigorous, meaningful learning. In practice, this means anticipating a range of learner needs (strengths, weaknesses, interests, background) and building flexibility into curriculum content, processes, and assessments. Rooted in cognitive neuroscience, UDL is structured around three core principles (CAST, 2018):

- providing multiple means of engagement (the "why" of learning): it emphasises engagement by offering varied ways to spark interest, motivation, and persistence. Gifted and 2e learners often need complex, interest-driven, and self-directed learning to stay engaged. UDL suggests giving students voice and choice in learning tasks, connecting content to their interests, and providing appropriate challenge and novelty (Cholach, 2011), like an independent research project on a favourite topic, or the creation of a multimedia presentation. Strengths-based engagement is critical for 2e students: many experts recommend that teachers first identify and develop each student's strengths and interests, using these as entry points for learning (Winebrenner, 2002). It highlights the importance of offering "interest-based" extensions as core activities (not just rewards). These engagement strategies resonate with UDL's aim to treat learners as "expert learners" who are purposeful, motivated, resourceful, and strategic (CAST, 2018).

- Providing multiple means of representation (the "what" of learning): presenting information and content in multiple formats allows all learners to access and make sense of it. Gifted and 2e learners benefit when teachers use diverse modalities (text, audio, video, manipulatives, diagrams, etc.) and explicitly scaffold complex material. Offering multimodal content is especially helpful for 2e students with language or decoding difficulties, together with assistive tools (text-to-speech, speech-to-text). Presenting information through multiple sensory modalities (visual, auditory, kinesthetic, and tactile) enhances comprehension, retention, and accessibility. For twice-exceptional students, who may experience difficulties with language processing, attention, or sensory integration, multisensory strategies can reduce cognitive load and provide alternative entry points to content (Salvia et al., 2009). Likewise, gifted students often benefit from dynamic, interactive learning environments that allow for deeper conceptual understanding through varied stimuli. In this way, UDL's flexible curriculum "accommodates each student's idiosyncratic pattern of strengths, weaknesses, styles, and interests" (Pisha and Coyne, 2001, p. 199), promoting equity in access to the curriculum.
- Providing multiple means of action and expression (the "how" of learning): for gifted and 2e learners, traditional tests or one-size-fits-all assignments may not capture their true abilities. UDL encourages teachers to provide choice in how learning is expressed, for example, through written work, oral presentations, art projects, digital media, portfolios, or dramatic performances. By using varied modalities for output, teachers reduce writing or memorisation barriers and reveal students' true understanding. Gifted learners can be challenged to create complex products (e.g. research presentations, mathematical models, programming tasks) that go beyond standard assignments. For instance, a UDL-informed teacher might present a complex scenario and let each student explore it at their depth – the gifted student might pursue an advanced

extension, while the 2e student might express understanding via a concept map or animated explainer video. In all cases, assessment is flexible.

These principles can guide educators in developing curricula that are responsive to diverse learning profiles, reducing barriers while maintaining high expectations for all students. In this way, it serves as a powerful tool to bridge the gap between accessibility and excellence, particularly for gifted and 2e students whose profiles often combine advanced potential with specific learning challenges. Pedagogical approaches grounded in UDL emphasise flexible goals, varied methods and materials, and ongoing formative assessment, allowing for instruction that is both rigorous and personalised. It is particularly relevant in ensuring that gifted and 2e students have appropriate opportunities to develop and fulfil their potential. A comprehensive UDL approach inherently addresses this dual need by embedding supports and challenges into the instructional design itself. Research underscores that 2e students can thrive in inclusive settings if they have access to appropriate strategies from both fields (Gierczyk et al., 2021). UDL, by design, enables such access: it builds in universal accommodations (e.g. flexible media and supports) that benefit students with learning disorders or disability, while also providing enrichment and choice that benefit gifted and average learners.

Research sustains that when classrooms adopted UDL strategies regularly, even gifted students increased their learning gains, because these strategies helped them become more engaged and independent (Cholach, 2011). In this study, gifted middle schoolers who practised UDL activities (with choice and flexible options) showed growth on multiple learning measures. UDL also inherently levels the playing field: by expecting multiple forms of engagement and expression from the outset, teachers raise the ceiling for everyone. Thoughtful design can reduce barriers, and learners, despite any difference, can engage in meaningful learning (Rao et al., 2023).

Despite its potential, barriers to UDL implementation, such as limited teacher familiarity and insufficient professional development, remain significant challenges (Fornauf & Erickson, 2018). Effective adoption of UDL requires systemic commitment through administrative support, resource allocation, and collaborative planning time (Council for Exceptional Children, 2024). Scaling inclusive practices within the UDL framework demands intentional efforts to address capacity gaps among educators and foster a culture of collaboration and continuous improvement (Godwin, 2018; Fornauf & Erickson, 2018).

Conclusions

This analysis has aimed to move beyond a reductive conception of giftedness, which is still too often equated exclusively with high academic achievement or elevated IQ scores. By adopting a multidimensional and dynamic perspective, it highlighted the complexity and heterogeneity of gifted profiles and twice-exceptional individuals, emphasising how potential may manifest in atypical and sometimes paradoxical forms. Giftedness, far from being a monolithic or uniformly advantageous condition, entails a nuanced interplay between exceptional abilities and developmental asynchronies.

One of the contributions of this study is the investigation of the neurobiological mechanisms underlying giftedness and twice-exceptional profiles. Emerging evidence points to specific brain patterns, increased neural connectivity, heightened sensory processing, and greater emotional reactivity. These characteristics, when not properly recognised or supported, may lead to diagnostic confusion or inappropriate labelling, with significant consequences for the individual's well-being and educational trajectory. These findings underscore the importance of adopting an integrated clinical and educational approach, able to identify both talents and vulnerabilities and respond to the full spectrum of needs that gifted and twice-exceptional individuals may present.

Authentic inclusion of these learners requires a cultural shift in how we conceptualise difference. Flexible and responsive educational practices are essential to this vision. Within this framework, the Universal Design for Learning (UDL) approach offers a compelling theoretical and practical model for designing learning environments that are equitable, accessible, and cognitively enriching. By embedding flexibility into the core of instructional planning, through multiple means of representation, engagement, and expression, UDL aligns closely with the diverse profiles of gifted and 2e students.

Ultimately, if schools are to become spaces where all learners, regardless of how their abilities manifest, can flourish, a profound cultural transformation is required. This transformation must be grounded in a commitment to educational equity and to the ethical imperative of understanding and nurturing the complexity of the human mind. Only then will we be truly able to recognize and support the “hidden geniuses” who quietly inhabit our classrooms, often without being seen.

Author contributions

The manuscript is the result of a collective work by the authors whose specific contributions are as follows: Anna Maria Mariani Introduction & paragraphs 3, 4; Eugenia Treglia paragraphs 1, 2 & Conclusions.

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