WorldTalentWeb

NEWSLETTER

FEBRUARY 2025

NEWSLETTER OF THE

WORLD GIFTEDNESS CENTER

ISSUE 34

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ISSN: 2709-0728

Editorial - Reaching for the Stars: Gifted Minds and the Wonders of the Cosmos

Penina Kiss & Jennie Quinn

A rare and breathtaking event unfolded in the night sky recently—the so-called "planet parade," where multiple planets aligned in a dazzling celestial spectacle. Stargazers in both hemispheres turned their eyes to the heavens to witness this extraordinary alignment, a reminder of the vast and intricate beauty of our universe. Events like these spark a deep sense of wonder, much like they did for the great thinkers of the Renaissance, who first sought to understand our place in the cosmos. Among them was Galileo Galilei, a figure whose insatiable curiosity and extraordinary intellect—hallmarks of giftedness—led him to revolutionize our understanding of the heavens. Yet, as is often the case with those who think differently, Galileo paid a price for challenging the status quo.

In the early 17th century, Galileo's telescope unveiled the moons of Jupiter, the phases of Venus, and the rugged terrain of our own Moon—discoveries that defied the geocentric worldview of the time. His intellectual courage, much like that of many profoundly gifted individuals, was met with resistance. Though his findings reshaped our understanding of the universe, they also led to his condemnation by the Church. Galileo's story serves as a powerful reminder that transformative discoveries often come at personal cost, but they pave the way for future generations of thinkers and dreamers.

Fast-forward to the 20th and 21st centuries, and we see the legacy of Galileo in the construction of the Hubble Space Telescope and the James Webb Space Telescope—wondrous machines that extend our sight far beyond what his early lenses could capture. These marvels of modern engineering were made possible by the collective brilliance of many gifted scientists, both men and women, who pushed the boundaries of human understanding. Their work, much like Galileo's, was driven by a relentless curiosity, an ability to see possibilities beyond the obvious, and a passion for uncovering the mysteries of the universe.

Among those who have inspired countless minds to contemplate our place in the cosmos is Carl Sagan, a gifted scientist, thinker, and communicator. His ability to translate the complexity of the universe into poetic musings, as seen in *Pale Blue Dot and Cosmos*, reflects the power of intellectual giftedness not just in discovery, but in storytelling. Sagan's reflections on Earth—"a mote of dust suspended in a sunbeam"—remind us of the fragility and interconnectedness of our existence. His gift was not just scientific insight, but the ability to ignite a sense of wonder in others, a trait essential to talent development.

As teachers, mentors, and advocates for gifted learners, our role is to nurture that same spirit of discovery in today's young minds. Whether a child dreams of mapping exoplanets, uncovering the secrets of dark matter, or simply understanding the poetry of the night sky, we must create learning environments that encourage curiosity, risk-taking, and deep engagement. We must champion a strengths-based approach, recognising the catalysts that fuel talent development—be it the right teacher, the right moment of inspiration, or the right challenge to stretch their thinking.

So where do we go from here? Beyond Webb, beyond what we currently know? The beauty of gifted minds is that they lead us into the unknown. Perhaps the next great discovery will come from a young stargazer inspired by this recent planetary alignment, or from a student who reads Sagan's words and sees the universe through new eyes. The cosmos remains vast and largely unexplored, and the future of discovery belongs to those who dare to ask, to wonder, and to reach for the stars.

Gifted education and talent development is not just about nurturing intelligence and creativity —it's about cultivating visionaries. Just as Galileo's telescope changed the way we see the universe, so too must we change the way we see and support our most brilliant minds. Who knows what wonders await when we give them the tools to explore, question, and dream?

We welcome the wonderful contributions of Professor Françoys Gagné, Bernadette Bentley and our own Jennie Quinn. Professor Gagné will share a brief legacy of his remarkable work spanning 40 years in the realm of giftedness and talent as he moves into the joys of retirement. How can one distill so much dedication into 2000 words? We are very thankful for your (*semi?*) final contribution to the field, Professor! Bernadette Bentley, via a podcast interview with the Australian Council for Educational Research (ACER), will share her insights on the identification of gifted learners in a three part series, and Jennie Quinn will discuss the role of system leadership in support of twice-exceptional students.

We hope you enjoy this edition and look forward to seeing you in the next one.

Penina & Jennie

My Professional Legacy Concerning Academic Talent Development

Professor Françoys Gagné, PhD,
Brossard, QC, Canada

After 45 years of involvement in the field of Academic Talent Development (ATD), commonly (but incorrectly) called Gifted Education, I decided two years ago to put an end to my professional career. As a final professional activity, I decided to publish a last document, my professional "chant du cygne". It became the core of a few public presentations, in the form of videoconferences. That "docu-conference" aimed to pinpoint some of the main ideas that I have fought for during that period of almost five decades. I forced myself to restrict my selection to a dozen themes, those most important to my heart. The first half focuses on the *Differentiating Model of Giftedness and Talent* (DMGT), a theoretical approach to talent development that has brought me international eminence. The more practical second half addresses the modalities of effective academic talent development programs. I discuss all these themes in more detail in a recently published book entitled "*Differentiating giftedness from talent*" (Routledge/Amazon, 2021). You can also find on my website (https://gagnefrancoys.wixsite.com/dmgt-mddt) dozens of downloadable documents on my work. As an appetizer, here is a brief overview of my professional legacy.

I – The DMGT: A unique conceptual model

1. Differentiation in theory

I chose talent development as my field of study in the late 1970s. As I read the work of major thinkers in that field, I quickly discovered that I was entering a conceptually chaotic world, a veritable Tower of Babel! [Examples are given].

Through these readings, the idea of differentiating potentialities from achievements rapidly imposed itself. In concrete terms, I adopted the concept of "aptitude" to represent the idea of potentiality. What are aptitudes? I define them as naturally developed abilities; I oppose them to "competencies" which correspond to systematically developed abilities or skills. You are certainly familiar with the phenomenon of underachievement, defined as a discrepancy between expected performance (the aptitude level) and actual performance (the acquired competencies). Well, "gifted underachievement" is a perfect concretization of the DMGT: it represents giftedness without talent!

Here is a visual summarization of the DMGT (Figure 1). First, note the two differentiating poles: the Aptitudes (G) component on the left and the Competencies (T) component on the right. These two poles anchor a central component: the Developmental process (D) through which students transform their aptitudes into competencies. These three components of the DMGT form the basic trio of the developmental dynamic: developing one's full potential means maximizing the effectiveness of this learning process. In the case of academic talents (TA top right), the relevant aptitudes belong essentially to the intellectual domain (GI) at left. The DMGT has two additional components: intrapersonal (I) and environmental (E) catalysts. You will find on my website numerous descriptions of the DMGT.

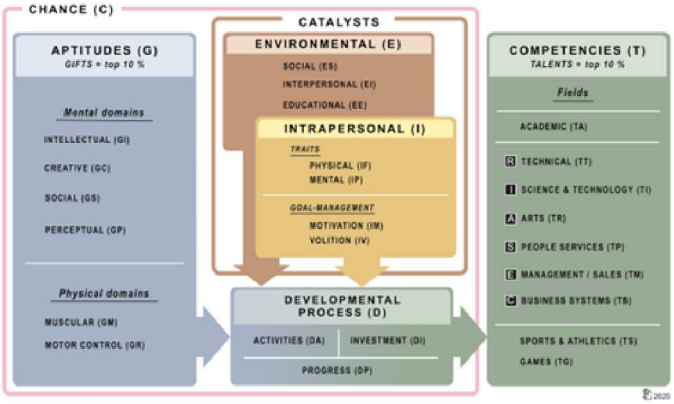

Figure 1. The DMGT (simplified version)

2. How many are there?

That second section discusses the issue of prevalence, mainly the reasons for my choice of the upper 10% of a reference population, both for aptitudes and for competencies. [You will find in my book a complete chapter on this subject]. It is the entry point of a four-tier system, called MB for metric-based. The other three levels are respectively top 1% (VERY gifted or talented), top 1/1000 (EXCEPTIONALLY), and top 1/10,000 (EXTREMELY). The MB system is simple, clear, and above all, it is generous.

3. Differentiation in practice

My third theme combines the first two to examine the practical impact in education of the gifted/talented differentiation. Everyone agrees that cognitive aptitudes are the preferred tool for acquiring academic competencies. It follows that intellectually gifted students have a better chance of acquiring an outstanding number of competencies, and thus of being labeled academically talented. But not all gifted students are talented, and vice versa. If the gifted and talented populations overlap only partially, what is the percentage of that overlap? The answer of thousands of conference participants approximates 70%. Yet, research shows that the real degree of overlap does not exceed 20%. Indeed, most intellectually gifted students (top 10%) are not academically talented (top 10%), and vice versa. In my book, I discuss this surprising result in detail. In conclusion, these figures confirm the importance of differentiating between giftedness and talent; they overlap much less than commonly thought.

4. The dynamics of talent development

My fourth theme looks at the dynamics of talent development. Again, I

invite you to access my website, where you will find extended discussions of the interactions between the five components of the DMGT model. Note also that my book devotes four chapters to them. This has led me to summarize talent development as follows:

Each talent *results from unique and complex choreographies involving a multitude of interactions between all components and subcomponents of the DMGT.*

This sentence implies that all talents are equally valuable regardless of the choreography followed, that is even if this choreography does not include the presence of giftedness.

5/6. Two themes set aside

I had planned two other themes around the DMGT, one on the role of genetics in the emergence of aptitudes, and the other on the importance of chance. But I finally left them aside, retaining just one quote from the work of J. W. Atkinson (1978) that, in my view, sums up these two themes pretty well: "All human accomplishments can be ascribed to two crucial throws of the dice over which no individual exerts any personal control. [...] A first roll of the dice determines an individual's heredity, and the other his formative environment." Note that the genetic background, which is, unfortunately, too often underestimated by professionals in the human sciences will influence the elements within component G (aptitudes) and component I (intrapersonal catalysts), while the second roll will act on the elements of component E (environmental catalysts).

II – Implementing a "real" Academic Talent Development (ATD) Program

The first two themes of the more applied second part deal with the WHY of an Academic Talent Development (ATD) program, while the other four describe the HOW, the modalities of implementation. The opening theme describes the first, and most important law of all learning.

7. At the heart of all learning: the fan spread effect

In any cohort of young students entering first grade, you will observe two phenomena. First, all these pupils will progress in their mastery of the contents, meaning that the competencies of the group as a whole will grow fairly steadily, month after month and year after year. Secondly, individual students will progress at different paces, some of them a little or a lot slower than average, and others a little or a lot faster than average. In short, there are very few truly "average" students. It is this dual phenomenon of group growth accompanied by significant individual differences that many researchers refer to as the first law of learning; others call it the "fan spread effect". Figure 3 illustrates the fan spread effect. Note that the extreme values of this range show a 4:1 pace ratio; the fastest learners are twice as advanced as the average, while the slowest learners have progressed twice as slowly. The twice as fast pace is almost never seen in education, but it is much more common in arts, especially music, and sports. Why is that so?

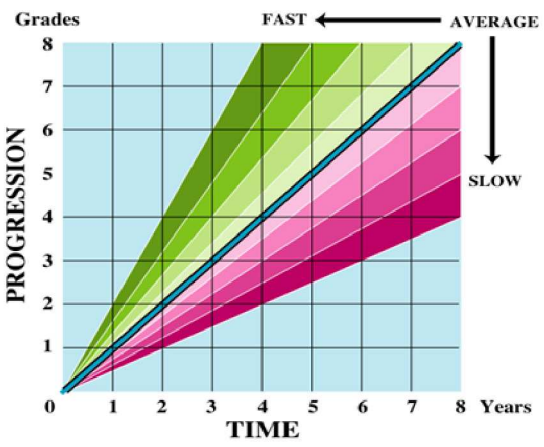

Figure 3. The fan spread effect.

8. A "curbed" fan spread

The fan spread effect looks great in theory, but we all know that the reality of our school systems is very different. For example, the green zone of the fan spread is virtually non-existent in any country. Why is this? Quite simply because its manifestation is subject to one important condition: the learning pace must be open. This allows each learner to progress at his or her own pace, whether fast or slow, thus maximizing the fan spread effect. Yet education systems the world over have been built around two main obstacles to its application. First, there is the age/grade lockstep norm: almost all students advance one degree per year, whatever their spontaneous learning pace. In other words, the vast majority of students follow the diagonal of the figure. There are very few grade skippers, and as few repeaters as possible. Yet, many thinkers, starting with Aristotle, have stated unequivocally: "There is no greater injustice than to treat unequal individuals equally".

Second, according to some U.S. studies, teachers generally adjust their pace to students performing at around the 40th percentile, i.e., clearly below the group average. Why this slow pace? It is to ensure the "success"—or should I say the lockstep "progression"—of as many students as possible. The absence of a true fan spread effect in educational systems around the world in no way signifies a lack of students with above-average academic competencies. Rather, it means that our school systems do not offer learning conditions that are likely to create challenges and stimulate the students' motivation and volition. In so doing, they completely fail in their fundamental mission: to enable all their students to develop their full potential. How can we correct this profound inequity toward talented students?

9. The conceptual framework of a true ATD

The document describes the views of an American educational philosopher, the late Professor Elliot Eisner from Stanford University. He defends the fan spread effect as the fundamental principle of a school program that will help all students develop "their mental and physical abilities to their fullest potential". In the document, I propose four constituent elements of a "true" academic talent development (ATD) program.

10. The curriculum of a true ATD

The first constituent element is the keystone of that program. It targets the enrichment of the regular school curriculum. I describe four types of enrichment (density, difficulty, depth, and diversity). By far the most important is enrichment in density, also called "condensation" or "compacting" of the curriculum. Why give it priority? Quite simply because it offers the most relevant response to the key characteristic of talented students, namely their ease and speed of learning. And note that talented students do not demonstrate their rapid learning pace episodically, but every single day. Therefore, the second constituent states that appropriate enrichment must provide intellectual challenges on a daily basis, in all subjects taught.

11. The administrative framework (grouping)

This need for constant curriculum enrichment for pupils in the green zone will constitute a real challenge for teachers. And the challenge will grow over time as the competence gap within this group widens. And yet, this is a *sine qua non* condition for the full development of these students' potentialities. Indeed, a wide range within the green zone will be the best proof that the school system has achieved its mission of developing the full potential of its students. But teachers face a major obstacle: the pressures exerted by the less competent students leave them no free time to plan and offer genuine enrichment in density. Hence the third constituent element of a true ATD: ability-based grouping. Is this an effective solution? Yes, without hesitation, as several studies have shown. But this effectiveness depends on one important condition: the regular presence of enrichment in density. Grouping is not an end in itself, but a means to better enrichment. Ability grouping is also an efficient

solution, as it allows schools to place in these groups specially trained teachers.

12. The administrative framework (acceleration)

The fourth and final characteristic targets a set of administrative modalities whose virtues I have been proclaiming since my first years in the field of talent development: academic acceleration. The various accelerative modalities smoothly ensure the continuity of enrichment in density. Indeed, once talented students have mastered the current school year's curriculum, often several weeks or even months before the end of the school year, what could be more logical than to begin the following year's curriculum, rather than occupying these students' free time with various types of enrichment in diversity, totally unrelated to the curriculum? And this immediate link with the more advanced curriculum leads very quickly to a progression through the grades, e.g., grade skipping or merged grades.

Unfortunately, most accelerating measures meet with strong resistance from a majority of administrators, teachers, and even some parents. They ignore or refuse to accept the overwhelming scientific evidence in favor of all forms of accelerated enrichment. Professor James Borland (1989) elegantly summed up this conundrum when he asserted:

“Acceleration is one of the strangest phenomena in the field of education. I can think of no other issue in which there is such a gulf between what research has revealed and what most practitioners believe. The research on acceleration is so uniformly positive, the benefits of appropriate acceleration so unequivocal, that it is difficult to see how an educator could oppose it.”

Visit my website and you will find several downloadable documents on this little-known gem.

Conclusion

You can download the full text of my professional legacy here https://gagnefrancoys.wixsite.com/dmgt-mddt/bio and you can see my swan song conference here https://www.youtube.com/watch?v=i7VQkQQ1eQc. Finally, take some time to explore my website https://gagnefrancoys.wixsite.com/dmgt-mddt

Supporting Gifted and Talented Students with Bernadette Bentley

Bernadette Bentley,
Education Officer Sydney Catholic Schools, Australia

The Australian Council for Education and Research (ACER) has given the WTW permission to publish an abridged transcript for Episode 2 of the Field Notes podcast; **Supporting gifted and talented students with Bernadette Bentley**

In this episode of the podcast, Marc Kralj speaks with Bernadette Bentley, Education Officer from SCS, about how gifted and talented students may be identified, supported and challenged.

Marc: *Today I'm joined by Bernadette Bentley. Bernadette Bentley has an amazing career and an amazing amount of knowledge and background that I've learnt over the last few years, and certainly over the last few conversations that I've had with her. Bernadette is currently the Education Officer for Research and Analytics with the Sydney Catholic Schools in New South Wales, and she's previously had the capacity around working as Education Officer for Gifted Education. So to begin with, I'd like to ask Bernadette just to talk a bit about herself, and also to give us a couple of definitions about our topic today. Thank you, Bernadette.*

Bernadette: *Thanks for having me, Marc. I'm very grateful to have this opportunity. Well, my background begins in the performing arts, and I studied at the New South Wales State Conservatorium from the age of 14, and my major was in piano, and then I completed my undergraduate there, and that was a Bachelor of Music Education. So I've taught and been head of department from K to 12 in Music, Dance, Drama, and Entertainment. I was always wanting to learn, so I've had further studies, and they've included performance diplomas with my piano work, NIDA courses in VET entertainment, and I've had the privilege of being able to complete 3 masters. So, my first one was in Education Administration, my second in Gifted Education, and the final one was in Educational Psychology, which has really helped me with my work with gifted education and with moving forward in research and analytics at Sydney Catholic schools.*

What we're talking about today is giftedness and the assessment of gifted students. And I think it's really important for us to start with – well, what does giftedness and what does talent mean? The majority of New South Wales schools look at Gagné's definition, and Gagné defines giftedness as the possession and use of outstanding natural abilities, and he calls them aptitudes. This is in at least one ability domain, and it's also to the degree that places that particular student in at least the top 10% of their aged peers. Talent designates the outstanding mastery of systematically developed abilities, and Gagné calls them competencies. So, it's the knowledge and the skills in at least one field of human activity to a degree that places the student at least among the top 10% of age peers who are or have been active in that field.

The system of levels applies to every domain. We've got systems of levels that start with classifications such as mildly gifted, moderately gifted, highly, exceptional and profoundly, and because giftedness domains are not closely correlated, individuals gifted in one domain are not necessarily the same as those gifted in another. So consequently, the total number of gifted and talented individuals and our students within our schools could far exceed the 10% value, and some studies indicate that it might well be at least 3 times larger than that.

We're talking about domains, and with Gagné he's got the Differentiated Model of Giftedness and Talent. He talks about the different aptitudes or domains, and he has the mental domains – which are the intellectual, creative, social and perceptual – and the physical domains of muscular and motor control. And then in his model, he's got the catalysts in the middle, and that's where we come in, you know – we've got to be able to provide an environment for our students so that they can grow, and we can nurture their gifts into talent. The intrapersonal: the traits of our students, whether they're twice exceptional, how their personalities fit in with the 5-factor model of a general personality structure – so looking at the broad domains of neuroticism or extroversion, openness, agreeableness and conscientiousness. Looking at that, and then the developmental process within the model, is a huge catalyst for us as educators.

So, what access do we provide our gifted students, the content – what format? What are other resources that we have? What's our engagement and perseverance with this? And how do we progress our students, what stages and what pace? Where's our turning points for these students? And then hopefully, we can help our students move to being talented, and having competence in different fields, such as academic or technical, in the sciences and technology, the arts, even people services in management and business and sports and athletics.

Marc: *Bernadette, thank you. I think it's really important that even before we start today's podcast that people have some definitions. I think we have a lot of misconceptions around what people think higher-order thinking is, high performing students, what they think gifted and talented is. I certainly know, as a parent – parents certainly have their idea about what gifted and talented is as well, so as an educator, as teachers and leaders in schools, it's important that if they are going down that avenue, that they have a clear concept of what these are. And if they don't – where do they go to find out? So, I know today's podcast will actually give a greater insight into that. I'd like to begin with this question to you, why is it important to identify students who are high performing?*

Bernadette: *It's really important to identify gifted students for several reasons. We don't identify them to label but to allow educators, parents and our educational leaders to address the unique needs and aptitudes of these students. So, some of the key reasons why identifying gifted students is crucial: the first one may be due to tailoring educational opportunities for these students, so gifted students who are gifted in an*

academic domain. They have advanced cognitive abilities and a faster pace of learning, so identifying them allows educators to provide more challenging and stimulating learning experiences that meet their intellectual needs. Tailored education opportunities can prevent boredom, frustration, and disengagement in the classroom, and also this may lead to the underachievement of these students.

Another reason is to optimise their aptitudes and their gifts. So, recognizing and nurturing giftedness can help these students reach their full potential and realise their aptitude into competencies and talent. Failing to identify and support these gifted students actually may result in missed opportunities for academic, creative or leadership development. By understanding and addressing their unique abilities, educators can help them excel and contribute significantly to various fields via the catalysts in Gagné's model, including the environment, the intrapersonal and the developmental process catalysts.

Another really significant reason that we need to identify our gifted students is their social and emotional needs. Our gifted students may face social-emotional challenges, such as feeling isolated, misunderstood, feeling different or dealing with maladaptive rather than adaptive perfectionism. Identifying them allows educators to provide appropriate support and foster a positive emotional environment. This can include programs addressing social skills or counselling services and creating a supportive peer community. Social-emotional learning needs to be embedded into the curriculum to support our students' affective and academic development. CASEL has a wonderful program that will help teachers to do that. Social-emotional needs are a construct of well-being. But so many people get social-emotional and well-being mixed up, and the two terms are not interchangeable.

Social-emotional is an integral part of education and human development, and social-emotional learning is the process through which all young people and adults acquire and apply the knowledge and the skills and the attitudes to develop healthy identities, to manage their emotions and achieve personal and collective goals, to feel and to show empathy for others, and establish and maintain supportive relationships and make responsible decisions. Whereas well-being is a multi-dimensional concept, and it takes into account the physical, mental, emotional, and social aspects of health, as well as the individual's capacity to achieve balance between facing challenges and having the resources needed to meet those challenges. Social-emotional learning is very close to my heart, and I'm very, very passionate about it. I think it's really important that we understand the difference between social-emotional learning and well-being.

Other reasons for identifying our students – we need to understand that identifying gifted students helps schools allocate resources effectively. This may involve differentiation, advanced work, acceleration, more depth, more breadth, more complexity within the coursework in the classroom. Additional teacher training to meet the unique needs of gifted learners is absolutely paramount, and proper resource allocation ensures that teachers can make the most of their resources to benefit all students.

We also have to look at equity in education. Identifying and serving gifted students is essential for promoting equity. Without the proper identification, gifted students from underrepresented groups may be overlooked, and this perpetuates the disparity in accessing educational opportunities. So, efforts should be made to ensure that gifted identification processes are fair and inclusive. We also want to prepare for future challenges. Gifted individuals often become leaders, innovators, and contribute to various fields, so identifying and nurturing their gifts early on helps prepare them for future challenges, fostering a generation of students who can make a real and significant contribution to society.

Also, finally, I think we need to make sure that we address diverse talents. Giftedness can manifest in various ways; we know with Gagné's model, it could be intellectual, creative, artistic, and leadership abilities. Identifying gifted students allows educators to recognize and address this diversity of talents and tailor intervention, support, and provisions to help our students in their specific areas of strength.

We look forward to bringing you Part 2 of Bernadette's podcast with Marc Kalj in our next edition where she discusses the identification of gifted students.

Twice Exceptionality from a System Leadership Perspective

Jennie Quinn
Specialist: Neurodiverse Learner Initiatives and Partnerships

Introduction

In 2015, the 2e Community of Practice (2e CoP) came to the consensus that, "Twice-exceptional individuals evidence exceptional ability and disability, which results in a unique set of circumstances. Their exceptional ability may dominate, hiding their disability; their disability may dominate, hiding their exceptional ability; each may mask the other so that neither is recognized or addressed" (Baldwin et al., 2015, p. 212). For up to 30% of our gifted students, this is their day-to-day reality (Munro, 2002).

To combat this masking effect and to identify and provide for these unique learners, teachers require access to quality pre and in-service training and strategic professional learning (Rowan and Townend, 2016; Miedijensky, 2018; Troxclair, 2013; Reis et al., 2014; Ottwein, 2020; Foley-Nicpon et al., 2013; Gierczyk & Hornby, 2021). They rely on universities and school systems for capacity building in this important area.

System leaders are therefore instrumental in ensuring that processes are in place for classroom teachers to receive the professional development needed to equitably identify 2e learners, nominate them for gifted programs and provide effectively for them. To more deeply understand these needs, a literature review into the impact of teachers' perceptions of 2e learners was carried out.

Literature Review

A review of current empirical research on the impact of teachers' perceptions about 2e learners showed 4 main emerging themes critical to the equitable provision of programs and resources for 2e students.

Theme 1 - Teacher perceptions on efficacy to identify and provide for 2e learners

Meeting the needs of an increasingly diverse community of learners is the reality of teachers in classrooms today (Rowan and Townend, 2016; Moon et al.,1999). Teacher perceptions of their ability to respond to the needs of diverse learners are influenced by a variety of factors including preservice training and preparation, ongoing professional learning and the provision of a collaborative team approach.

Specialized training with limited exposure to diverse learners may affect teachers' perceptions of students (Lee and Ritchotte 2018; Willard-Holt et al., 2013; Miedijensky, 2018). More than ever before teachers need to be equipped to address student diversity within their classrooms (Lucas and Frazier, 2014; Coleman and Gallagher 2015; and Rowan and Townend, 2016) and they need detailed knowledge of what giftedness means and the ways it coexists with various learning disabilities (Foley-Nicpon et al., 2013; Reis et al., 2014).

This literature review reinforced that teacher efficacy can be improved through education and experience (Gallagher, (2007) cited by Rowan and Townend, 2016, p. 8) as well as initial teacher training and ongoing professional development (Geake and Gross, 2008; Bianco and Leech 2010; Lee and Ritchotte, 2019; Jung, 2014; Matheis et al., 2020). Since many Australian universities do not provide specialised studies in gifted education for preservice teachers (Plunkett and Kronborg, 2007; Mullen & Jung, 2019) this poses a challenge.

Research suggests that without training, teachers are ineffective at identifying gifted students in their classrooms and that personal bias and stereotypic expectations affect whom they choose for gifted programs (Siegle and Powell, 2004; Bianco and Leech 2010; Ottwein, 2020; Matheis et al. 2020). Lee and Ritchotte (2018, p. 69) state that "Educating twice-exceptional students requires school personnel to be trained in recognising the characteristics of these unique learners. A lack of understanding of the phenomenon of twice-exceptionality is a huge barrier to nurturing students' talents."

Theme 2 - Teacher Perceptions that inhibit 2e students from access to gifted programs

Bianco and Leech (2010, p. 319) remind us that since teachers are the gatekeepers for gifted programs, "...teachers' perceptions of students with disabilities and their knowledge of gifted characteristics become a critical component for initial identification of giftedness among twice-exceptional learners." The literature confirms that teachers do come with preconceptions and stereotypical views about 2e students and that they are more inclined to focus on the disability rather than their strengths and talents leading to under-representation in gifted programs (Missett et al., 2016; Mullen and Jung, 2019; Bianco & Leech, 2010 and Matheis et al., 2020).

Mullens and Jung (2019) reference the Australian Senate Inquiry (2001) which highlighted that negative attitudes toward high ability exist among school personnel and that teachers may be less positive about fostering gifted students (Geake & Gross, 2008). Jung (2014), discussed the need to dispel the notion of the gifted as advantaged and privileged, establishing that diverse learners should be supported with appropriate interventions. Twice-exceptional students are some of the most under-identified and underrepresented in gifted programs due to low expectations about the academic abilities of students with disabilities (Missett et al., 2016, p.19). Egalitarian beliefs and a social justice perspective prioritising those at the lower academic range (Mullen and Jung, 2019) compound this issue.

The literature review revealed that diverse learning teachers are often more inclined to focus on disability than giftedness and are far less likely to refer twice-exceptional students for gifted programs (Missett et al., 2016; Lee and Ritchotte, 2018). Special Educators were the least likely to refer students with or without disabilities to gifted programs (Bianco and Leech, 2010) often leading to disengagement and socio-emotional and behavioural issues (Ng et al., 2016; Rowan and Townend, 2016). Findings from Gierczyk and Hornby (2021), highlighted the importance of developing student strengths as well as working on challenges and this was strongly supported in the research of Willard-Holt et al., (2013) and Reis et al., (2014).

Theme 3 - Teacher Training/Professional Learning and impact on Perceptions of 2e learners

The literature review highlighted that teachers who have access to quality teacher training, targeted professional learning, as well as strong leadership driving a collaborative team approach, are more likely to identify 2e learners for gifted programs and focus on a strength-based approach for intervention and adjustment (Miedijensky, 2018; Troxclair, 2013; Reis et al. 2014; Ottwein, 2020; Foley-Nicpon et al., 2013; Gierczyk & Hornby, 2021; Bianco and Leech, 2010; Rowan and Townend, 2016). When students feel valued for their talents and are given adjustments that enable them to show what they know, they are more likely to feel challenged, engaged and have greater self-efficacy.

Historically, preservice teachers have had little training regarding gifted students (Troxclair, 2013; Rowan and Townend, 2016; Bianco and Leech, 2010; Geake and Gross, 2008; Gierczyk and Hornby, 2021; Foley-Nicpon et al., 2013; Lee and Ritchotte, 2019; Matheis et al., 2020) leading to potential bias and skepticism about giftedness coexisting with learning difficulties (Willard-Holt et al., 2013).

The review also highlighted the need for collaboration and co-teaching skills as part of teacher training to promote teacher efficacy to utilise a team approach when working with twice-exceptional students (Roberts et al., 2015; Coleman and Gallagher, 2015; Gierczyk and Hornby, 2021; Foley-Nicpon et al., 2013; Missett et al., 2016). The need for cross-disciplinary training to support the twice-exceptional emanated strongly in the literature (Lee and Ritchotte, 2018; Gierczyk and Hornby, 2021; Lee and Ritchotte, 2019) and when done appropriately can break "…down barriers between general, gifted and special education" (Baldwin et al., 2015, p. 211).

Bianco and Leech (2010) assert that a lack of teacher preparation for special education teachers leads to deficits over strengths being recognised and remediated and twice-exceptional students remaining unidentified and underrepresented in gifted programs. Reis et al., (2014) concur stressing the need for a strength-based approach to avoid the frustration and underachievement that occurs when only weaknesses are addressed. Foley-Nicpon et al., (2013) assert that gifted educators rather than special educators are the most knowledgeable about twice-exceptional students and therefore the most capable of providing professional learning for educators in this area.

Theme 4 - Teacher perceptions about the need for further legislation policy and guidelines for 2e students

In the words of Roberts et al., (2015, p. 215) "Legislation and policy lead to action" and when it comes to marginalised populations like 2e learners, action is what is required. This literature review highlighted the need for further legislation both in Australia and internationally to focus on the requirements of 2e learners and provide mandates for their equitable representation in gifted programs (Roberts et al., 2015; Long et al., 2015; Coleman & Gallagher, 2015; Baldwin et al., 2015; Lee & Ritchotte, 2018; Roberts et al., 2015, Reis et al., 2014).

Roberts et al., (2015, p. 217) emphasised how the 2e CoP (2015) definition of twice-exceptionality helped shape, "legislation, teacher preparation programs, parameters of eligibility and program accountability" for twice-exceptional learners and identified the need for explicit guidelines on identification and programming due to a lack of public laws or statutory requirements to define or identify twice-exceptional learners.

This need for 2e policy and guidelines was outlined by Foley-Nicpon et al., (2013) who stress the gravity of implementing policies that advocate funding for twice-exceptional learners as the current system is far from addressing their needs. Current research states that policies for twice-exceptional learners need to ensure identification, a focus on professional learning as well as practitioner-friendly resources and infrastructure for twice-exceptional students (Bianco and Leech, 2010; Coleman and Gallagher, 2015; Miedijensky, 2018). Research by Long et al., (2015) asserts that schools with a gifted policy are more likely to provide for their gifted students and that Principals with a policy to follow are more likely to provide resourcing and professional development for teachers.

Rowan and Townend (2016, p. 21) discussed the need for teacher preparation to be conceptualised in universities, schools and policymaking as an ongoing process consistently and appropriately resourced and Coleman and Gallagher (2015) advised that 2e policy should ensure 2e students are provided with interventions for disability just as they are provided interventions for giftedness.

Conclusion

In conclusion, this literature review highlighted teacher perceptions regarding 2e learners and exposed a gap in the research regarding the role of System Leaders in providing it. Targeting professional learning on the themes emanating from this literature review is needed to ensure 2e learners thrive and avoid underachievement, alienation, disengagement and a mismatch between the curriculum and their academic and psychosocial needs.

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Dubai, United Arab Emirates

WORLD GIFTEDNESS CENTER

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