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Teachers' Perceptions on Teaching Mathematically Gifted Students

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ABSTRACT

Teacher colleges and universities play a crucial role in shaping the education of gifted students by training future educators. However, in South Africa, teachers do not receive specific training on how to teach gifted students. This lack of training may prevent them from recognizing the needs of gifted learners and adjusting the curriculum and teaching strategies to support their development.

This study aimed to examine teachers' perceptions of teaching mathematically gifted students. A mixed-methods approach was employed, involving both qualitative and quantitative research. Data were collected from 116 Mathematics teachers using a questionnaire that included both closed and open-ended questions. The analysis was conducted in two phases: first, a quantitative examination of responses to closed-ended questions, followed by a qualitative analysis of open-ended responses.

Findings indicate that most teachers possess limited knowledge about mathematically gifted students. Based on these results, the paper recommends that teacher training programs at higher education institutions include modules on educating mathematically gifted students. Furthermore, there is a need for qualitative research to explore the actual classroom practices during mathematics instruction.

KEYWORDS: Gifted education, Mathematically gifted students, Mathematics instruction, Teacher perceptions, Teacher training

INTRODUCTION

South African public schools have made significant progress in expanding access to education and improving social equity indicators. However, Hanushek and Wößmann (2009) argue that equity alone is insufficient; innovation is also essential for success in the 21st-century knowledge-based economy (KBE). Recognizing the importance of talent in driving innovation, Heidrick and Struggles (2007) describe it as the "new oil" that supports effective education systems capable of improving lives. Within this context, mathematically gifted students are regarded as "the world's ultimate capital asset" because they provide a continuous supply of individuals who will lead research and development toward a knowledge-based economy (Sever, 2011).

Despite their potential, gifted education in South Africa has been historically neglected. Kokot (1998) highlighted the decline in support for gifted students due to the dismantling of specialized programs and the reassignment of expert teachers to other departments. Until 2012, little progress had been made, but recent government initiatives have sought to address these challenges. Task teams investigating the implementation of Mathematics, Science, and Technology (MST) strategies found that the education system primarily focuses on underperforming schools while neglecting gifted students. As a result, recommendations have been made to establish Math and Science Academies in each province, conduct extensive mathematics talent searches in rural areas, and implement policies to nurture young scientists and innovators (NPC, 2012; DBE, 2012; DST, 2013). The DST's Youth into Science Strategy aims to build a pipeline of researchers and innovators to enhance South Africa's competitiveness. These efforts highlight the urgency of prioritizing gifted education to address the systemic crisis in education.

The success of gifted students largely depends on the knowledge, training, and attitudes of their teachers (McCoach & Siegle, 2007). Teaching gifted students requires instructional adaptations to meet their unique learning needs (Kokaridas & Patsiaouras, 2014). Research shows that teachers' self-efficacy—their belief in their ability to influence student learning—affects their attitudes, motivation, and classroom behaviors (Bandura, 1997; Bandura et al., 1996). Teacher beliefs, defined as personal convictions about teaching and learning, also shape their perceptions and judgments (Pajares, 1992). Perceptions, attitudes, and beliefs are closely interrelated, influencing

how teachers approach gifted education (Nel et al., 2011). Given the significant role that teacher perceptions play, this study examines South African teachers' opinions and beliefs regarding mathematically gifted students to inform the development of effective intervention programs.

With this foundation, the study explores teachers' perceptions of teaching mathematically gifted students. The findings aim to contribute to gifted education by informing policymakers about the need for structured programs to support mathematically gifted learners in regular classrooms. Additionally, the results will provide insights for tertiary institutions to enhance teacher training and preparation. Ultimately, this study seeks to deepen understanding of teachers' perspectives on gifted education and its implications for improving educational outcomes.

PROBLEM STATEMENT

Over the years, various models have been conceptualized to enhance the education of high-achieving students. However, as former U.S. President Barack Obama emphasized, technological advancements such as wireless devices and sophisticated software will have little impact on education without skilled teachers in the classroom. Research highlights that gifted students are present in both specialized and mainstream classrooms (Milton & Taylor, 2006), making it essential for all educators, not just those involved in gifted programs to acquire the necessary skills to design and implement effective learning experiences.

Despite this need, both pre-service and in-service teachers receive minimal training on the unique learning needs of gifted students (Pierce et al., 2007). Traditional classroom settings offer limited opportunities to develop the competencies required to support these learners effectively, creating a challenge for educators (Kettler, Oveross & Bishop, 2017). As a result, teacher education, training, and support should prioritize equipping teachers with the skills necessary to address the diverse needs of gifted students.

In the South African context, Kokot (1999) argued that the exclusion of gifted education from teacher training programs is a significant oversight. She emphasized that teacher colleges and universities play a crucial role in shaping the education of gifted children, either by equipping future teachers with the relevant skills or neglecting this aspect

entirely. Advocates for gifted education reform should therefore focus on these institutions to ensure meaningful change. If teachers are not adequately trained to meet the needs of gifted students, it raises concerns about how they identify and respond to these learners in their classrooms. This study is based on the premise that a lack of training may hinder teachers from recognizing gifted students' unique needs and adapting curriculum and instruction to support their learning effectively.

RESEARCH QUESTION, AIM AND OBJECTIVES

Research Questions

The study sought to answer the following primary research question: How do teachers perceive the teaching of mathematically gifted students?

Based on the literature review, the following sub-questions were formulated: (1) How do teachers perceive their readiness to teach gifted students? (2) How do teachers perceive their awareness of recent developments in gifted education? (3) What are teachers' attitudes toward gifted students?

Research Aim and Objectives

This study aimed to investigate teachers' perceptions of teaching mathematically gifted students. The research objectives were to: (1) Assess teachers' perceptions of their readiness to teach gifted students; (2) Examine teachers' awareness of current developments in gifted education; (3) Explore teachers' attitudes towards gifted students.

LITERATURE REVIEW

Evolution of Giftedness Concept

The concept of giftedness has evolved significantly over time. Galton (1869) first coined the term "gifted child," describing individuals with inherent potential for high achievement, though his approach has been criticized for bias. This study adopts a more inclusive definition of giftedness, drawing from Tannenbaum (1983) and Gagné

(2009, 2015). Tannenbaum emphasized that giftedness requires both innate ability and environmental support, while Gagné differentiated between "giftedness" (natural ability) and "talent" (developed through learning). Gagné argued that most gifted students are "mildly gifted" and should be supported within mainstream classrooms. This view highlights the importance of teacher training in gifted education (Taylor & Milton, 2006).

Traits of Gifted Learners

Gifted learners, particularly those with mathematical abilities, exhibit distinct traits such as a strong affinity for numbers, quick understanding of mathematical concepts, and abstract thinking. They are creative problem solvers, persistent, and passionate about learning. Additionally, they demonstrate advanced reading skills, exceptional focus, independence, and curiosity (Stepanak, 2019).

Value of Gifted Individuals

Gifted individuals, whether academically or mathematically inclined, are valuable assets due to their potential for both immediate achievements and long-term societal contributions. They are recognized for their ability to excel academically and make meaningful contributions to society (Besjes-de Bock & de Ruyter, 2021).

Identifying Gifted Learners in South Africa

The identification of gifted learners varies across contexts. In South Africa, giftedness is not typically assessed through IQ tests, as is common in other countries. Instead, giftedness is often assessed privately by psychologists through testing, with standardized assessments in areas like reading, comprehension, and mathematics helping to determine proficiency (Palmer, 2021; Matthews & Farmer, 2016; Elder, 2021).

Key Attributes of Gifted Individuals

Studies indicate that gifted individuals, especially those excelling in creativity and productivity, share key attributes, including exceptional aptitude, dedication, and

creativity. Renzulli's model of giftedness emphasizes skills such as information processing, abstract thinking, and persistence. Sousa (2019) also highlights inventiveness and risk-taking as essential qualities of gifted individuals.

Debate on Identification Purpose

While identification is crucial, there is ongoing debate about its purpose. Renzulli (2020) argues that identification should focus on selecting students for specialized programs. In contrast, Coleman (2016) and Van Tassel-Baska (2021) suggest that identification should inform curriculum provision for all students. Eyre (2021) emphasizes considering early accomplishments and behaviors in identifying gifted learners and fostering environments that nurture their abilities.

Effective Teaching for Gifted Learners

Effective teaching is essential for ensuring gifted students receive the appropriate support. Gifted children, like all students, deserve to learn something new every day (Shaughnessy & Senior, 2022). They thrive under teachers who understand their unique learning and social-emotional needs (World Council for Gifted and Talented Children, 2021). Research identifies key competencies for teachers of gifted students, such as setting high expectations, creating a supportive classroom climate, and demonstrating passion for teaching (Gentry, Steenbergen-Hu, & Choi, 2011).

Teacher Competency and Training

Teacher competency is vital for effective instruction. Professional training, policy awareness, and positive attitudes toward gifted education are essential components of teacher competency (Tardif, 2006). Specialized training at both pre-service and in-service levels can significantly improve instruction for gifted students (Kylie, 2013), with inadequate teacher preparation leading to misconceptions and negative attitudes about gifted education (Rowley, 2012; Lewis & Milton, 2005).

Policy Awareness and Its Role in Gifted Education

In South Africa, there is no specific policy for gifted learners, and they are primarily educated in mainstream classrooms with a focus on equalizing educational opportunities (Oswald & Rabie, 2017). Following the global trend of inclusive education, South Africa aims to provide quality learning for all students, regardless of

their abilities (UNESCO, 1994). Education White Paper 6 emphasized inclusive education, ensuring that all students are supported to reach their full potential (DoE, 2001).

Policy-Level Strategies for Teacher Support

Effective policy-level strategies are necessary to aid teachers in identifying and supporting gifted students (Gubbins et al., 2021; Haug, 2020; Hodges et al., 2021). In countries lacking specific policies for gifted learners, teachers play a critical role in recognizing and addressing their needs (Lenvik, Jonesb, & Hesjeda, 2022). A clear understanding of policies is crucial for effective implementation.

Teacher Attitudes Toward Gifted Education

Teacher attitudes are equally important in supporting gifted students. Teachers who understand the needs of gifted learners are more effective in identifying and supporting them (Eyre et al., 2002). Exploring teachers' perspectives on teaching mathematically gifted students in diverse classrooms is essential for improving gifted education in South Africa.

The concept of giftedness has evolved, but challenges remain in identifying and supporting gifted learners, especially in South Africa. The lack of policies and reliance on mainstream classrooms highlights the need for better teacher training and awareness. Ongoing efforts in policy improvement and teacher education are crucial to supporting gifted students' success.

METHODOLOGY

Research Design

The study employed a mixed-methods approach, incorporating both qualitative and quantitative research. Data were collected through a questionnaire that included both closed- and open-ended questions. The responses were analysed to compare teachers’ perceptions.

Research Instrument

A structured questionnaire was used to assess teachers’ perceptions of teaching and learning mathematically gifted students in South Africa. The questionnaire was divided

into six sections: Bibliographical information, teacher preparation, awareness of recent developments in gifted education, teacher attitudes and strategies for identifying gifted students, grouping strategies, and barriers to gifted education

Participants

Using a convenience sampling technique, the study recruited 118 mathematics teachers from various districts in the Free State province of South Africa.

Validity and Reliability

Validity ensures a questionnaire measure what it intends, with key types including content, predictive, and construct validity (Leavy, 2017; Creswell & Cresswell, 2018). Experts reviewed the instrument using face validity, providing feedback on unclear terms, item selection, additional content, and formatting.

Reliability refers to result consistency, commonly tested using Cronbach's alpha and factor analysis (Leavy, 2017; Creswell & Cresswell, 2018). A Cronbach's alpha of 0.75 indicates reliability but may reflect response bias (Barbera et al., 2021; Wiley, 2020). Due to a small sample, findings cannot be generalized to all South African mathematics teachers, and the lack of an Afrikaans translation may have affected clarity (Cohen et al., 2011).

Procedure

A written information sheet outlining the study's purpose was provided to all participants. Informed consent was obtained from the teachers who participated in the research. Participants were assured of data confidentiality and their right to withdraw from the study at any time without penalty. Authorisation to conduct the research was granted by the relevant authorities in the Free State Department of Education.

RESULTS AND DATA ANALYSIS

In this section, the results and discussion are organised based on the three research questions raised for the study. Data analysis was carried out in two phases: quantitative analysis of responses to close-ended questions and qualitative analysis

of responses to open-ended questions. Both quantitative and qualitative results are presented together to support a comprehensive argument.

Teachers' perceptions of their readiness to receive training on teaching gifted students

The first research question focuses on teachers' perceptions of their readiness to receive training on teaching gifted students. Their responses are summarised in Table 1.

Table 1: Teacher preparation (N = 116)

1.0 TEACHER PREPAPATION				
1.1 In which of the following areas where you trained to teach?	**Numeracy/ Mathematics**	**Literacy**	**Life Skills**	**Other**
	f(%)	*f*(%)	*f*(%)	*f*(%)
	79.7	77.1	70.3	314
	Agree	**Neutral**		**Disagree**
	f(%)	*f*(%)		*f*(%)
1.2 Did you receive training on how to teach gifted students?	34.7	39.8		25.4
1.3 Do you feel competent enough to teach gifted students?	5.1	31.4		63.6
1.4 Do you think Higher Education Institution should include content on gifted Education?	88.1	5.9		5.9

The analysis of responses to question 1.1 shows that 79.7% of teachers were trained to teach numeracy (some selected multiple options). For question 1.2, 34.7% of teachers had received training to teach gifted students, 39.8% were neutral, and 25.4% disagreed. Regarding question 1.3, 5.1% felt competent to teach gifted students, 31.4% were neutral, and 63.6% disagreed. For question 1.4, 88.2% believed higher education institutions should include gifted education content.

Open-ended responses revealed that teachers 016, 023, 039, and 043 were trained in languages, with specific mentions of home languages like Sepedi and Setswana, while teachers 009, 025, 031, and 047 were trained in Biology and Physical Sciences.

Teachers' awareness of current developments in gifted Education

The second research question is about teachers' awareness of current developments in Gifted Education. The focus was particularly on South African policy

pronouncements in different documents that make specific recommendations on the education of gifted students. In this context our view to policy is that of a politically derived intervention whose purpose is to resolve a perceived societal problem.

Responses to this research question, in Table 2, indicate teachers' perceptions about their awareness of the latest policy pronouncements in relation to gifted education. Table 2 presents teachers' views on their knowledge of recent policy updates in this area.

Table 2: Teachers' awareness (N = 116)

2.0 AWARENESS OF LATEST DEVELOPMENTS IN GIFTED EDUCATION	Agree	Neutral	Disagree
	f(%)	*f*(%)	*f*(%)
2.1 Recently the National Planning Commission released a statement on vision 2030 entitled our future. I read the document	22.9	23.7	53.4
2.2 I am aware of the National Planning commission's recommendation regarding gifted students	22.9	30.1	46.6
2.3 The department of Basic Education set up a task force to investigate Into the implementation of Mathematics, Science & Technology Education. In 2012 their report was published. I read the document.	25.4	38.1	36.4
2.4 I am aware of the Task Force's recommendation regarding gifted students	19.5	48.3	32.2
2.5 The new CAPS documents come with guidelines for responding to student diversity in the classroom	76.3	17.8	59.3
2.6 The document makes enough provision for teachers to attend to the needs of gifted students	48.3	39.0	12.7

Teachers were asked to select the relevant boxes in items 2.1 to 2.6. The responses indicate that teachers are not aware of the latest developments in gifted education. Additionally, the responses suggest that the CAPS document does not provide detailed information on gifted students. However, responses to question 2.5 reveal that 76.3% of teachers were aware of the new CAPS document, which includes guidelines for addressing student diversity in the classroom.

Teachers' attitudes towards gifted students

The third research question examines teachers' views on gifted students. As indicated in Table 3, it is apparent that teachers have gifted students in their classrooms. The

answers to question 3.1 reveal that 80.5% of teachers acknowledged having gifted students in their classes.

Table 3: Teachers attitudes (N = 116)

3.0 TEACHER ATTITUDES AND STRATEGIES FOR IDENTIFICATION OF GIFTED STUDENTS			
3.1 I have gifted students in my class	**Agree**	**Neutral**	**Disagree**
	f(%)	*f*(%)	*f*(%)
	78.7	12.8	4.3
3.3.1 Gifted students can make it on their own without teacher support	61.7	20.1	18.2
3.3.2 Gifted students should receive special attention from the teacher	63.8	14.7	11.5
3.3.3 Gifted students are troublemakers in class	44.7	0	55.3
3.3.4 Gifted students ask questions that teachers are not ready for	68.1	11.8	20.1
3.3.5 Gifted students should be educated in their own special classes	31.9	0	68.1
3.3.6 Gifted students should be educated in the normal class with all other students	55.3	22	22.7

Questions 3.3.1 to 3.3.6 asked teachers to indicate their agreement with various statements, with the option to select multiple responses. Table 3 shows that two-thirds of teachers agreed with questions 3.3.1, 3.3.2, and 3.3.4, respectively, indicating that 61.7% believe gifted students can succeed independently, 63.8% think they need special attention, and 68.1% agree they ask questions teachers are unprepared for. Nearly half (44.7%) agreed with 3.3.3, suggesting gifted students can be troublemakers. On 3.3.6, 55.3% agreed that gifted students should be educated in regular classes, while 31.9% supported separate classes for them, as per 3.3.5.

Question 3.2 was open-ended, seeking responses on how teachers identify gifted students. Five themes emerged from the analysis: students' participation in the classroom, students' performance in the classroom, pace of learning or completing tasks, students' achievement, teachers and possible concomitant problems.

Students' Participation in the Classroom

The "Students' Participation in the Classroom" theme highlights how gifted students actively engage, contribute, and ask questions, reflecting their strong academic interest.

Teacher 0012: "Student is actively participating. If he/she gets a wrong answer, they are keen to get the correct answer and are always learning and disciplined."

This response highlights both active participation and a strong desire for improvement, showcasing an engaged and disciplined student.

Teacher 0011: "Student always participating. Student is disciplined."

A concise acknowledgment of a student's consistent involvement and discipline, which are key aspects of classroom participation.

Teacher 0029: "Generally bored, very quick to complete tasks, and has a penchant for questioning."

These extracts highlight students' active participation and discipline, with a focus on eagerness to improve, consistent involvement, and the challenge of engaging gifted students who quickly finish tasks and seek more stimulating challenges.

Students' Performance in the Classroom

The "Students' Performance in the Classroom" theme highlights how gifted students excel through strong participation, quick thinking, and the ability to handle complex tasks.

Teacher 0003: "These are children who are always inquisitive and demand more answers from teachers."

This statement reflects students' eagerness to learn and go beyond what is taught in class, signalling strong performance and curiosity.

Teacher 0039: "Those who answer even before you finish asking questions."

This highlights students who not only excel in performance but are also quick thinkers, showcasing a high level of cognitive processing.

Teacher 0038: "Their ability to respond to higher-order thinking questions."

These comments highlight students' exceptional cognitive abilities, including curiosity, quick thinking, strong performance, and aptitude for higher-order thinking.

Pace of Learning or Completing Tasks

This theme highlights how gifted students quickly grasp new concepts and complete tasks faster than their peers, requiring more challenging work.

Teacher 0023: "Always finish their work fast, answer even before you finish the question, and do so correctly."

This highlights the rapid pace at which students complete tasks and their proficiency in doing so accurately, a sign of advanced learning abilities.

Teacher 0035: "They finish before others even start thinking about it."

This demonstrates how quickly these students grasp and complete tasks, often leaving others behind, which underscores their advanced cognitive abilities.

Teacher 0041: "By finishing their work quickly and through good communication."

These comments highlight students' speed, accuracy, and advanced cognitive skills, with quick task completion, strong communication, and the ability to finish ahead of others.

Students' Achievement

The theme highlights gifted students' academic excellence, including strong performance in assessments and across subjects, showcasing their advanced cognitive skills.

Teacher 0005: "The way they answer questions shows a deeper or alternative insight."

This reflects students' ability to provide nuanced or creative responses, indicating a deeper understanding of the material.

Teacher 0031: "They are doing well in their classes or others."

This highlights strong overall performance, not just in their primary class but across other subjects, demonstrating broad academic success.

Teacher 0026: "Easier for new info, fast, and comes up with new approaches than given."

These responses highlight gifted students' exceptional abilities: one teacher notes their creative thinking, another acknowledges their strong performance across subjects, and a third highlights their quick learning and innovation.

Possible Related Problems

This theme highlights challenges gifted students face, like boredom and disruption, which need to be addressed for their success.

Teacher 0021: "Gifted students perform better and become bored in class."

Points to the challenge of keeping gifted students engaged, as their higher performance leads to boredom in less stimulating environments.

Teacher 0024: "Gives answers beyond my expectations, becomes easily bored, and disrupts lessons."

This highlights a common issue where the high expectations of gifted students for engagement lead to boredom, which can result in disruptive behavior.

Teacher 0027: "Gifted students are troublemakers in class."

These comments highlight the challenges of engaging gifted students, whose high performance and need for stimulation can lead to boredom, disruptive behavior, or challenges to authority. More stimulating tasks are needed to keep them focused.

DISCUSSION

With reference to first research question on teacher readiness to teach gifted students one of the striking results was that only 55% of the respondents were trained to teach numeracy. One would have expected a bigger percentage of teachers trained in numeracy given that our respondents were mathematics teachers. It is a matter of concern that in South Africa there are still teachers who are teaching mathematics without being trained in mathematics. Similar results were observed by van der Westhuizen & Maree (2006) who lamented that the education of the gifted in South Africa was exacerbated by a poor quality of teachers and teaching (including poor subject knowledge and poor motivation). Another study by a South African team of experts on teacher quality confirmed this and commented that not all South African teachers of mathematics have the required levels of skills for the classes they teach, hence the low student pass rates in mathematics (Taylor & Taylor, 2012). Teachers are key in developing students' interest in mathematics and differentiating the curriculum for the gifted students.

In the same category of questions, we were also interested to know whether the participating teachers were also trained to teach gifted students. Results show that only 21% were trained to teach gifted students suggesting that most of teachers have not received training on how to teach gifted students. It would have been interesting to know where these teachers were trained to teach gifted students given that literature in South Africa suggests that teachers' colleges and universities lack training of faculty regarding teaching the gifted (Kokot, 1999) and that it is a huge tragedy that giftedness had been deleted from teachers' training (Kokot, 2011). Our results are like Oswald & de Villiers' (2013) findings where teachers acknowledged their central role in the identification and education of the gifted student but confessed to a lack of training. Pierce, et.al (2007) also found out that both current and pre-service teachers typically receive little training in the learning needs of gifted students, especially in how to tailor academic instruction to meet such needs. This lack of training may prevent teachers from identifying students' needs and properly modifying curriculum and instruction to enhance their learning. Thus, pre-service training programs and professional development for current teachers regarding the needs of exceptional students is recommended. Grové (1990) was in favour of compulsory courses in gifted education for all undergraduate teachers in training and for all who wish to follow a postgraduate course in education.

In response to a question on teacher awareness of policy pronouncements on the need to identify and nurture gifted students, results show that more than half of the teachers have not read the document vision 2030 and the 2012 Task Force's report on gifted students. Thus, most of the teachers are not aware about the National Planning Commission as well as the Task Force's recommendations regarding gifted students. Of those teachers who read the new CAPS document, most lamented that the document does not make enough provision for teachers to attend to the needs of gifted students. Inadequate information in a policy document can lead to a misunderstanding on the part of the implementors who may be confused as to what exactly is required of them. Similar studies by Hupe (2011) have shown that the more unambiguously formulated the goals of a public policy or policy programme are, the clearer the implementation will be. Before students who are gifted (and others) will be able to receive appropriate education and support, this gap – between policy ideals and classroom realities regarding the gifted education – needs to be addressed.

With reference to teacher attitudes towards gifted students our results confirm other studies which have shown that the characteristics of gifted students are much like two sides of the same coin because on one side gifted students have characteristics that can manifest themselves in positive ways while on the other hand some gifted characteristics are exhibited in ways that may be considered counterproductive (Manning, 2006). For example, participants in our study had positive perceptions about gifted students' participation, their performances in class, their pace of learning as well as their achievement. However, our participants also had negative perceptions such as gifted are troublemakers, ask teachers questions that are difficult to answer and become bored in class. The surveys done by Bain, Bliss, Choate, & Brown (2007) and Copenhaver & McIntyre (1992) revealed attitudes among educators without formal training in gifted education that threaten the foundation of the field built by gifted education proponents. Untrained and inexperienced teachers of the gifted labelled student characteristics such as boredom, rebelliousness and laziness as negative traits while trained and experienced gifted education teachers were more likely to recognize the same characteristics as the natural outcome of frustrating experiences in learning environments that were not meeting students' needs. Similarly, Manning (2006) warned that some behaviours can be troubling to the classroom teacher; and when these behaviours are demonstrated by students, they may be perceived as

negative when, in fact, they could be indicators of giftedness. When non-productive behaviours arise in a classroom, it is important to look at the causes of the behaviours, rather than just at the behaviours. Being aware of their root causes will help teachers more fully meet gifted students' needs and build positive relationships vital to meaningful classroom experiences.

Despite most teachers indicating that gifted students should be educated in the normal class with all other students, it was worrisome to note that more than half of the teachers agreed that gifted students can make it on their own without teacher support. This is worrisome because it suggests to us that such teachers would not bother themselves to meet the needs of gifted students in the mainstream classrooms where they teach. Similarly, in a study by Bain at al., (2007) preservice teachers were found to believe that gifted children would excel in school without receiving any special services and can effectively be served within the regular classroom setting. Furthermore, Bain et al., (2007) confirmed that teachers hold such preconceived and erroneous notions regarding the nature of gifted children and their academic and emotional needs. Yet research has consistently shown these are pervasive myths about gifted kids that impede their educational progress (Bain, Bliss, Choate, & Brown, 2007). According to Bain et al (2007) this demonstrated a disconnect between participants with no training in gifted education and research-based best practices. Untrained teachers with naïve beliefs about giftedness may fail to identify students using accepted criteria and instead identify students who conform to their expectations (Moon & Brighton, 2008). Such problems of gifted students are compounded by the fact that most of a gifted student's education occurs in a regular classroom setting under a mainstreaming model, where teachers have little to no specialized training in gifted education and are unprepared to meet the unique academic needs of gifted students (Sisk, 2009).

The authors would like to thank their colleagues in the Department of Mathematics, Sciences, and Technology Education at the Central University of Technology for their assistance in preparing this paper. Nonetheless, the views, findings, and recommendations presented in this study are entirely those of the authors and do not reflect the opinions of either the Department or the University.

CONCLUSION

The findings of this study underscore significant gaps in teacher preparedness for addressing the needs of gifted students in South Africa, particularly in mathematics education. While most mathematics teachers have received some form of training, a concerning percentage remains untrained in key areas such as numeracy and gifted education. Furthermore, the lack of awareness and understanding of national policies related to gifted education among teachers highlights a disconnect between policy intentions and classroom implementation. Despite some positive attitudes toward gifted students, there are evident misconceptions about their needs, leading to an underestimation of the support and differentiation required for their success in mainstream classrooms.

Overall, significant strides need to be made in teacher training, both pre-service and in-service, to equip educators with the knowledge and skills necessary to support gifted students effectively. The current gap in specialized training, particularly in gifted education, is an obstacle to providing these students with an appropriate learning environment that fosters their unique abilities.

FURTHER RESEARCH STUDIES

Future research should assess the effectiveness of teacher training programs in supporting gifted education, explore the link between teacher attitudes and gifted student outcomes, and examine the gap between national policy and classroom implementation. Additionally, studies could investigate how teachers adapt curricula for gifted students and compare gifted education models across regions. Addressing these areas will help create a supportive environment for the growth of gifted students.

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