
Experiences of Gifted Mathematics Students in Mainstream Classrooms

Maria Galea

Abstract

The purpose of this study was to investigate the daily educational experiences of gifted mathematics students in mainstream classrooms in Malta. Gifted students have their own special educational needs, mostly the need to be provided with an intellectually challenging environment commensurate with their abilities. However, little is known about whether the intellectual needs of gifted students are met in Maltese mainstream classrooms. Online interviews were conducted with 9 gifted mathematics students in Year 8 and Year 9 attending various schools in Malta. Thematic analysis was used to analyse the data. The findings of this study indicate that the experiences of gifted mathematics students are enhanced when they are actively involved in learning. Secondly, it appears that participants lack relevant and meaningful experiences, and a challenging learning environment. Finally, evidence suggests that differentiated teaching strategies are underutilised or not appropriately implemented, resulting in participants having excessive extra time at hand. This study highlights the need for the teaching of mathematics to move away from a whole-class approach. Thus, it is suggested that both on a national level and at a school level there is commitment to provide training for educators on student-centred approaches that include active learning and differentiation.

Keywords

Inclusion, gifted, mathematics, student-centred, active learning, differentiation

Introduction

An external audit in Maltese schools revealed that differentiation was not being implemented in most classrooms and teachers expressed difficulties in teaching mainstream classes with students with diverse needs (European Agency for Special Needs and Inclusive Education, 2014). Efforts to improve this situation culminated in the development of A Policy on Inclusive Education

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in Schools: Route to Quality Education, which was published by the Ministry for Education and Employment (MEDE, 2019). One of the overarching goals of the mentioned inclusive policy is “to provide meaningful and relevant learning experiences that maximise the potential of the learner” (MEDE, 2019, p. 13). Various extracurricular activities targeted for gifted students, such as ‘Mathematics Olympiad’, ‘Mathematics Activities for Gifted and Talented Students’ and Maths Trails are organised by Education Officers for Mathematics within the Maltese Ministry for Education (MFED). However, little is known about whether gifted mathematics students are being provided with meaningful and relevant learning experiences in their classrooms.

Purpose of This Study

The purpose of this study was to gather information from gifted mathematics students in Malta about their daily experiences in mainstream classrooms. It sought to explore the extent to which the experiences of gifted mathematics students identified in the literature are reflected in Malta and what we can learn from the local context that may be useful to local practice and to the wider education community. The study addressed the following research question: What are the experiences of gifted mathematics students in mainstream classrooms?

Review of Literature and Current Thinking

It has been recognised in literature that gifted students have their own special educational needs, most particularly the need to be provided with an intellectually challenging environment (Siegle, 2018; Borg Marks, 2018). A mismatch between the learning environment and their intellectual ability may lead to experiences of boredom, demotivation, and underachievement (Pfeiffer & Prado, 2018).

Definition of Giftedness

The current study is guided by an understanding of giftedness as an innate above-average ability that can manifest itself and develop with the correct external factors such as the environment, the motivation level, and the persistence level (Gagné, 2004; Kaufman, 2013). A recent study by Leikin et al. (2017) with gifted mathematics students indicates unique cognitive characteristics such as flexibility, originality, creativity, good working memory and pattern recognition. A range of terminology is used to describe this group of learners such as ‘highly able’, ‘advanced learners’ and ‘gifted and talented’.

Although the term 'gifted' is not the researcher's preferred choice, as it gives the impression that giftedness is fixed rather than malleable (Dweck, 2000, as cited in Matthews et al., 2014), it is the term mostly used in Malta and therefore, it will be used in this article.

Learning Tasks

Several studies have investigated gifted students' experiences and their perceptions on tasks which they find engaging. Handa (2020) for example, carried out a study in Australia in primary and secondary schools. The study involved both comprehensive and selective schools, and most of the participant students were identified as gifted. Results drawn from the online survey show that gifted students feel more engaged in learning when tasks are interesting and relevant to their daily lives. Furthermore, students in this study valued and enjoyed tasks which involved higher-order thinking such as inquiry and high-level meaningful discussions. Similar findings were obtained from a study (Gomez-Arizaga et al., 2020) carried out with 12 gifted students in mainstream schools in Chile using photos, focus groups, and interviews. The authors highlight that gifted students are more engaged in learning when activities are meaningful to their daily lives, hands-on, open-ended, and challenging. In contrast, they consider tasks which are repetitive and lack challenge as an obstacle to reaching their potential. Similarly, gifted students in an exploratory study by Borovay et al. (2019) reported that they enjoyed inquiry-based activities because they found them to be more challenging and to require more concentration.

Gomez-Arizaga et al. (2020) argue that if learning is not meaningful and related to real life, then students may lose interest and motivation. In the same vein, Oswald and Rabie (2017) assert that gifted students need to be provided with enriched and challenging environments. However, research shows that the learning environment is not always commensurate with the intellectual abilities of gifted students. For example, findings from a study in South Africa by Oswald and Rabie (2017) with 6 gifted students in regular classrooms indicate that gifted students in the study are bored in their regular classes as they do not find schoolwork challenging or stimulating enough and they often feel neglected. These results are echoed in a study by Özdemir and Bostan (2021) with 11 gifted mathematics students in a middle school in Turkey. Findings suggest that the tasks given in their mathematics classes do not cater for the intellectual needs of gifted mathematics students. Participants in this study expressed their desire for additional differentiated tasks which are more stimulating,

challenging, and meaningful. Given the need for challenge and stimulus in their learning, it is unsurprising that gifted mathematics students in this study feel frustrated when they are not allowed to use their own creative ways for solving mathematics problems. Instead, they are instructed to copy the teacher's method, even if their method is quicker than that of the teacher. Furthermore, one student in this study complained that the teacher made them copy all the mathematics notes which the student had no problem remembering and would have liked to take note of only what was necessary. This need for intellectual freedom and creativity was also reported in a study by Watts (2020) with 10 gifted students (Grades 3 to 5). Participants in this study also expressed a strong desire to use their own investigative methods and to learn in ways that work for them. Even though there is insufficient evidence for generalisation, taken together, the findings from these three studies suggest that learning tasks may not be stimulating, meaningful and challenging enough for gifted students. Furthermore, these findings shed light on the desire of gifted students of all ages to have more autonomy on how they do their work. This desire may be the result of the unique cognitive characteristics of originality and creativity of gifted mathematics students when solving problems (Leikin et al., 2017).

Although the above studies were all carried out in different countries and in different educational contexts, their combined findings indicate a consensus that tasks that are hands-on, related to students' daily life and involve higher-order thinking all help to engage gifted students in learning and improve their experiences in the classroom. However, there seems to be some evidence to indicate that learning tasks in mainstream classrooms are not always appropriate for the intellectual needs of gifted students as they lack stimulus and challenge.

Use of Classroom Time

Inefficient use of classroom time is a recurring issue for gifted students in mainstream classrooms and it seems to be a main cause for boredom. A study by Mammadov (2019) with 8 gifted students in Turkey reports that its participants complained about the slow pace of instruction. Although Mammadov's findings cannot be generalised due to the small scale of the study, its findings concur with the findings of a large-scale study in England by Tereshchenko et al. (2019) with 89 students from 8 secondary schools. Like the students in Turkey, gifted students in England described their lessons as boring, easy and slow.

Furthermore, a common negative experience highlighted by gifted students in the study by Gomez-Arizaga et al. (2020) is the excessive extra time they have at hand while waiting for the others to finish their tasks. Waiting time was perceived by such gifted students as a hindrance to their progress to new content knowledge. This is supported by a formative evaluation of differentiated practices in 78 elementary classrooms in Texas, reporting a whole class-paced approach which does not allow for acceleration or enrichment (Johnsen et al., 2020). The authors noted that some students who finished early just sat and waited or did an unrelated task such as reading a library book. Furthermore, Johnsen et al. (2020) reported that teachers tended to give their attention to the students who were struggling. Overall, these studies indicate the need for teachers to always have extra material at hand for gifted students. In addition, as recommended by Özdemiş and Bostan (2021) and Gomez-Arizaga et al. (2020), teachers should ensure that the extra material is interesting and requires higher-order thinking.

The findings outlined above indicate that negative experiences of gifted students in mainstream classrooms in various countries are often related to repetition, slow pace of instructions and excessive waiting time. Moreover, these studies clearly indicate that a whole-class approach is not appropriate to cater for the needs of gifted students.

Differentiation

Contrary to a whole-class approach, differentiation involves the use of different approaches to cater for the individual needs of students so they can reach their full potential (Cowley, 2018). As argued by Akar (2020), gifted students need to be provided with enriched and differentiated tasks. This is in line with expectations of gifted mathematics students in Turkey who expect more differentiated tasks to meet their needs (Özdemiş & Bostan, 2021). Even though differentiation is considered crucial for gifted students in mainstream classrooms (Yuen et al., 2018; Tereshchenko et al., 2019), various studies have indicated that differentiated practices are lacking or not used effectively. For instance, gifted students in South Africa pointed out that little was being done to differentiate the curriculum (Oswald & Rabie, 2017). This is supported by findings of a large-scale study by VanTassel-Baska et al. (2021) in six different school districts in four states in the Eastern United States. The authors found, from observations in elementary, middle and high schools, that differentiated practices are often underutilised or not properly implemented to accommodate

gifted students. A whole class instruction was dominant in most classes with one lesson plan for all students. Mathematics classrooms were the exception to this as teachers used differentiated practices effectively and provided opportunities for gifted learners to accelerate through the content. Drawing from the students' responses, both VanTassel-Baska et al. (2021) and Oswald and Rabie (2017) concluded that most teachers were not properly trained to differentiate the curriculum to challenge gifted students according to their abilities.

Overall, the findings presented in the above studies suggest that differentiation is underutilised or not appropriately implemented. In addition, the findings demonstrate the need for teachers to engage more in dialogue with their students to evaluate differentiated practices.

Research Design and Implementation

Research Approach

A qualitative approach was used to obtain an in-depth picture from the point of view of insiders. Data was collected through online semi-structured interviews of approximately 30 minutes. As argued by Boudah (2011) and Cohen et al. (2018), interviews allow the researcher to obtain information from an insider's perspective. Furthermore, as argued by Boudah (2011), semi-structured interviews allowed the flexibility to elaborate on certain topics. Considering that this study was carried out during the pandemic of COVID-19, online interviews made it possible to collect data when both interviewer and interviewee were in the safety of their home. Like the traditional face-to-face interview, in an online audio-visual interview the body language and facial expressions can still be observed (Cohen et al., 2018). One disadvantage of online interviews is that they depend on online access and may be prone to technological glitches (Cohen et al., 2018). However, on a national level, students in Malta had online access to enable remote learning during the pandemic. Furthermore, students were by the time of the study very familiar with online calls.

Classroom observations of learning tasks, group work, use of classroom time and differentiated practices would have added to the study's validity by cross-checking the findings (Denscombe, 2017). In addition, observations would have made it possible to record in more detail the experiences of gifted mathematics students to obtain a clearer picture (Leedy & Ormrod, 2015; Denscombe, 2017).

However, due to the restrictions imposed on schools during the pandemic, observations from outsiders were not allowed. This can be considered as a limitation of this study, as classroom observations would have helped the researcher to cross-check the findings and to obtain a clearer picture of what it is like to be a gifted mathematics student in mainstream classes in Malta.

Participants

Purposive sampling was used to ensure that participants are gifted mathematics students. In such a sampling approach participants are chosen purposively because their unique characteristics and experiences are directly related to the phenomena being investigated (Cohen et al., 2018). The invitation was sent to ten students (Year 8, Year 9) who at the time of the study were participating in the international tournament *Mathematics without Borders*, which targets young people who are exceptionally gifted in mathematics. Arguably, this ensured that participants in the current study are truly gifted in mathematics. Nine of the students accepted the invitation to participate in this study.

Implementation

After ensuring the parents/guardians' informed consent and participants' assent, the interviews were carried out on *Zoom*. The interviews were kept to the planned time of approximately 30 minutes. No significant technological glitches were experienced except for some lag in two interviews. The interviews were recorded with the interviewees' permission, and interviewees were given the choice to answer the questions either in Maltese or in English. Most of the interviewees seemed at ease during the interviews. Their assertive voices while putting forward their perceptions suggested that they were not trying to please the researcher but rather wanted to make their voices heard. The recordings were transcribed and, where applicable, translated to English.

Data Analysis

The responses of the interviews were transcribed verbatim. Thematic analysis was used as it is an appropriate method for analysing data collected from interviews (Menter et al., 2011). Keeping in mind the research questions, the data were analysed rigorously for recurring themes, new themes, and contradicting themes. The findings are reported around three themes and six subthemes, and verbatim quotes are used to support the results.

Trustworthiness

The researcher approached this study with an open mind and was careful not to express her personal stand during the interviews and to reflect on her personal beliefs throughout all the research process. All the necessary approvals and permissions to conduct this research were sought from the relevant ethics committees and authorities. The principles outlined by the United Nations Children's Fund (UNICEF; Graham et al., 2013) were taken into consideration. Upon completion of the research, a copy of the dissertation was provided to MFED and the Institute for Education (IfE).

Findings

The findings are presented around three main themes: learning tasks, use of classroom time, and differentiation. Excerpts of the participants' responses support the findings. Gender-neutral pseudonyms are used to protect the participants' identity.

Learning Tasks: Hands-On and Real-Life Context

Gifted students in this study enjoy tasks that are hands-on and related to their daily life as such tasks are considered fun, interesting and meaningful:

I took part in an Erasmus mathematics project, ... most of the activities were in class. ... it was very fun and very interesting because we learned not only maths, but also maths applied to other things ... It was quite hands-on (Quinn)

I find them just fun because you can actually see how maths is everywhere (Taylor)

Some participants pointed out that they learn better when tasks are hands-on or related to real life as such tasks help them to visualise the problem and relate to it:

I like such tasks ... everyone has [their] own way of learning. ... I learn better if I do practical activities (Kai)

When they are connected to real life, I find it easier to relate to, because it's not just something completely abstract (Quinn)

In contrast, one participant stated that applying mathematics to real life may sometimes complicate learning:

Sometimes it makes it easier to understand. Sometimes though, ... when applying to real life it gets more complicated ... if the real-life variant is more complex than the syllabus. ... It shouldn't be like stretching the topic (...) to get to (...) real-life (Reese)

As observed through their response, Reese gives much importance to exams and hence, a possible explanation for this contrasted view might be that Reese does not consider the application of mathematics relevant to exams.

One participant pointed out their preference for hands-on activities because they take an active role:

I like certain activities where we actually do the thing not just listening and copying ... it's not like the regular activities (Quinn)

The above comment may also suggest that such activities are not regularly experienced in the maths class. This is supported by other participants:

We don't do these activities really often ... where you apply what you learn in the school building ... because at school all it would be is to listen. (Ellis)

We didn't have much of these tasks, it's more like sitting down writing. (Kim)

Taken together, the above responses indicate that participants value and enjoy tasks in which they are actively involved in learning mathematics.

Learning Tasks: Higher-Order Thinking – Intellectual Challenge, Freedom and Creativity

This study found that participants enjoy tasks that involve higher-order thinking. This was evident throughout all interviews. Tasks which involve higher-order thinking are considered more interesting and a stimulus for the brain. Some of the responses are presented below:

I mostly like problem solving ... the ones in which you really need to think, ... something different, ... the ones you have to use your brain ... [they] excite me because I have something to think about, to chew over. (Kim)

This year the teacher asked us this question which required more thought ... it was harder and offered a challenge ... In this question you could merge ideas and thoughts to come to the final answer. It was more challenging. It was an interesting experience. (Ellis)

... our maths teacher had asked us to find the formula for the area of a circle ... It was more interesting than simply giving us the formula and just applying it to the questions. (Reese)

Higher-order thinking tasks are also valued by the participants as they are an opportunity to use their talent and boost their confidence:

I really like challenging tasks ... because we use our talents (Morgan)

They boost me up because they give me some confidence, like when I finish them ..., it makes me happy because I say I am capable of doing this. (Kim)

Despite participants' need for higher-order thinking tasks, as shown above, intellectual challenge seems to be quite lacking in the classroom. The following are only few of the responses which illustrate this:

Most often we do challenging questions together in class with the teacher so there is not much thinking. (Alexis)

We are given problems, but they are on a much easier level ... tasks are way too easy, and we are not having fun ... because maths is really easy. (Morgan)

Furthermore, some of the participants expressed feelings of frustration and boredom with unchallenging tasks:

I don't find a lot of them very challenging really, I find it very frustrating (Quinn)

The problems at school are not very challenging ... It's like I'd wish I'd fall asleep. (Sydney)

I don't find the questions we have to work challenging ... Sometimes it gets a bit boring because it is always the same and sometimes it is good to have a change to be able to be free and try to figure out things in your own way. (Kim)

When asked which tasks they do not like, most participants pointed out their dislike for repetitive tasks. Participants consider such tasks unchallenging, an obstacle to reaching their potential and to moving on to learning new things:

This idea of repetitive work, for example you have 5 problems which are the exact same and they just have different numbers ... In my opinion it's [a] waste of time. (Reese)

I don't like when they give us a lot of calculations to do ... that's not how my brain works, I like to work harder things ... I just want to move on. (Taylor)

If you do about 15 similar questions with long working, it would be boring as there would be nothing new ... maths should be about analysing the problem and how to solve it out. (Alexis)

In contrast, two participants said that they like to do all the assigned work. A possible explanation for this might be a conscientious approach to learning.

I like Maths. I like doing what the teacher asks. (Kai)

I like all maths work because I enjoy doing it. (Kim)

Most participants expressed their desire for more challenging work:

When we go for Maths without Borders training sessions, they are much much better than school experiences. ... the maths and even the methods the teacher present us with, they are very challenging. So, if there were more like that maths in class it would be better. (Ellis)

We could have more challenging work, that's the main thing that I would suggest. (Kim)

Another reported negative experience was the lack of intellectual freedom and creativity when solving mathematics problems. Some participants reported that they are not allowed to use their own methods to solve mathematical problems and feel frustrated when they are instructed to write all the details in the working:

There is one [negative] thing ... you have to do exactly the same method as the teacher ... Teachers should let the students try it out themselves. (Alexis)

I find it frustrating to write all of my working because I do a lot mentally ... I find it a bit pointless ... the teachers expect you to write down a lot of extra. (Quinn)

Most of the time we just get a method and you are told you have to strictly follow it ... I feel it is a bit too rigid. (Kim)

In summary, the above responses indicate that participants enjoy tasks that involve higher-order thinking. However, it seems that they have little opportunity to experience intellectual challenge, freedom and creativity.

Use of Classroom Time: Pace of the Lesson

Many participants remarked that they are bored with the slow pace of the lesson as teachers keep on explaining the same mathematics problem repeatedly to the students who are struggling to understand. Participants remarked that they would prefer to progress to new content:

The teacher would go on explaining it for the entire class ... It is quite stressful ... I want to move on to the next problem ... that happens quite often because it happens whenever anyone has a problem they don't understand. (Taylor)

The slow pace may also result in gifted learners feeling neglected. One participant stated irritably:

Sometimes we listen to the working of the same sum up to 5 times ... for the ones who did not understand ... then for me it gets quite boring because you get fed up ... the system ... is more focused on slower learners ... and so, we are left behind (Ellis)

On the contrary, another participant comprehends the necessity for a slow pace as he does not see any alternative:

I can understand the teacher ... it's better to have all the students understanding but going at a slower pace than going at a faster pace and having half the class not understanding ... I don't really know what can be done to prevent it. (Reese)

The above comments indicate that while a single-pace, whole-class approach may cater for the students who need more time to understand, it does not cater for the intellectual needs of gifted learners.

Use of Classroom Time: Waiting Time

Given the slow pace of instruction and the whole-class approach, it is unsurprising that most participants expressed their concern about the excessive time they have at hand. The following are only few of the responses which illustrate this:

Usually, the teacher expects us to work it out around the same time so then we can correct them together to discuss the problems. Every time I finish early, I'm quite bored because I'm just waiting for everyone else (Taylor)

I will have half of the lesson I won't be doing anything, practically. I wait, practically, I won't have anything else to do. I feel a bit sad (Morgan)

Like Reese mentioned earlier, some of the participants comprehend why they must wait:

I can understand why the teacher doesn't say 'Start another part of the work', because the other students would still be working out the problems. (Quinn)

A few participants reported that occasionally they are provided with extra work when they finish early:

Sometimes I might have extra work occasionally, normally I wouldn't ... (Quinn)

I remember last year when I finished early the teacher sometimes asked me 'Could you calculate in this method instead?' or 'Could you do this next exercise, it's more challenging?' and I find that pretty fun most of the time ... the teacher was pretty flexible, and she did that quite a lot. (Taylor)

Some participants suggested that the teacher could give them additional, more challenging work to make better use of the excessive time at hand:

I would prefer if the teacher provides me with challenging questions instead of doing my own work [prepared in advance by the student] ... but it has to be like much, much more challenging than the exercises we do in class. (Ellis)

... maybe they could be given some extra work ... because it doesn't make sense just to stare ... (Kim)

Taken together, the above responses suggest that participants often experience excessive waiting time, in which they are not provided with additional challenging work.

Differentiation: Acceleration of Content

Some participants of this study noted that while the teacher moves with a slow pace, instead of waiting, they accelerate through the booklet. The booklet is generally a workbook prepared by the teacher for each topic and includes notes, problems that will be worked out in class and exercises. A participant, notes that this may be a form of differentiation:

I keep going on through the notes ... I start by doing what everyone is doing, but then I finish off by continuing the sums ... So, almost every lesson I do something different from the rest. (Ellis)

However, it is important to note that although the booklet offers an opportunity to participants to move at their own pace, difficulties seem to arise, first when gifted students need the teacher's help and secondly, when they finish the booklet quite ahead of the other students.

I find that a lot of the time ... I spend it ... working ahead, like doing work proposed for the next few days ... I like how I do it. ... Sometimes it's a bit frustrating because I wouldn't understand something, and I would have to stay waiting for everybody else (Quinn)

Sometimes the teacher tells me to do the next sum but it's like ... always working the next sum ... the following day ... I would have already finished it. (Ellis)

The above findings suggest that although there seems to be some type of acceleration, there does not seem to be a planned structure to support it.

Differentiation: Differentiated Work

Although differentiated work can cater for gifted students' intellectual needs, it seems to be very lacking. Following are some of the participants' responses when asked whether they are given differentiated work:

I don't think so. ... no, I'm not given different work. (Kai)

No. Never. (Sydney)

Not really. No (Reese)

No, it is always the same. (Kim)

... so far, I have never done anything different. (Morgan)

Only one participant reported that they were given differentiated work. However, this only occurred during two scholastic years:

[it] was only different just in Year 7 when I used to do the Algebra pack of Year 8 and Year 9 level ... And sometimes in Year 6 ... there were these 3 handouts with different levels, and I would do the hardest one. But no

longer ... everyone does the same things and like it's not good. ... [the teachers] prepare one paper for a whole class ... and so for me it comes really easy ... (Ellis)

Together these results suggest that differentiated practices may be lacking or not appropriately implemented.

Discussion

Considering the above findings, three main conclusions emerge from this study. Firstly, the findings confirm previous research findings discussed in the literature review which show that the educational experiences of gifted mathematics students are enhanced when they are actively involved in learning (Handa, 2020; Gomez–Arizaga et al., 2020). However, as can be noted from various comments presented in the findings, it seems that learning mathematics for most participants in this study is more about listening, writing notes, and working individually. Secondly, the results indicate that gifted mathematics students in this study lack an intellectually challenging environment. This is in line with the findings of Özdemiş and Bostan (2021) that work given in mathematics classrooms is not challenging or stimulating enough. Consistent with literature (Handa, 2020; Gomez–Arizaga et al., 2020; Borovay et al., 2019; Oswald & Rabie, 2017; Özdemiş and Bostan, 2021), this study found that participants enjoy tasks that involve higher–order thinking. Such tasks are considered by participants as a stimulus for the brain, and an opportunity to use their talent and boost their confidence. However, it appears that these intellectual and psychological needs are hardly addressed in the mathematics class. Finally, evidence from this study suggests that differentiated teaching strategies are underutilised or not used effectively, resulting in participants not being adequately challenged, and being left with excessive extra time at hand. This supports the finding of several studies in different countries (Yuen et al., 2018; Tereshchenko et al., 2019; Oswald & Rabie, 2017; VanTassel–Baska et al., 2021). Taken together, the above conclusions are consistent with various studies discussed in the literature review (Oswald & Rabie, 2017; Özdemiş & Bostan, 2021; Mammadov, 2019; Johnsen et al., 2020) which show that the needs of gifted students are not appropriately catered for in mainstream classrooms.

This study's findings support the findings of the external audit of the European Agency (2014) mentioned previously, that differentiation is hardly being implemented in Maltese classrooms. Overall, the findings indicate that

teachers struggle to cater for the needs of gifted students. The findings outlined in this study highlight the need for mathematics teaching to move away from a traditional whole-class approach and instead adopt differentiated practices which cater for the exceptional abilities of gifted students. There is, therefore, a definite need on a national level for professional development on differentiated strategies with a special focus on gifted students. Professional training activities should also include opportunities to visit differentiated classrooms, if necessary abroad. Addressing the diverse abilities in mainstream classrooms may be challenging; however, with adequate training and educators' determination to make it work, successful implementation of differentiation would be possible.

This study indicates that there is a definite need for a well-planned strategy in schools to appropriately cater for the needs of gifted students. It is therefore recommended that school management teams prioritise this issue by including it in their school development plan. A whole school approach is necessary to scaffold learning to ensure the progressive development of gifted students throughout all their schooling. This requires strong commitment from the school management team to provide professional training on teaching strategies appropriate for gifted students to all educators. Such training should be as practical as possible; hence, it is recommended to include mentoring and lesson studies. Lesson studies aim to build teachers' expertise in a particular teaching strategy by having teachers plan a lesson together, implement, evaluate, reflect on, and improve it (Basister & Kawai, 2018). As argued by Stigler and Hiebert (2016), lesson studies can significantly ameliorate teaching and learning in schools. Lesson studies are carried out over a long period of time; therefore, if this recommendation is taken on board, the school management team must also be committed to allocate time for teachers to meet regularly.

As highlighted in the literature review and in the findings of this study, the learning experiences of gifted students are enhanced when they are actively involved in learning and when this learning involves higher-order thinking. This points to the need for teachers to implement active, student-centred pedagogies such as inquiry-based learning (IBL). Considering the findings of this study, which highlight participants' desire for more challenging work and their need to discuss mathematics with their peers, the use of IBL in mathematics classrooms is highly recommended as it will present students with an achievable challenging mathematics problem and allow them to collaboratively try out different mathematical ideas before they find the solution (Ernst et al., 2017).

Learning through inquiry is beneficial to all students, most particularly to gifted students, as through IBL they may experience intrinsic motivation to learning (Borovay et al., 2019). This recommendation can be extended to other teachers teaching STEM subjects. Furthermore, there is a need for teachers to engage in dialogue with gifted students on how they experience classroom life and on ways to improve teaching and learning.

Conflict between covering the content and quality of learning is commonly experienced by teachers (Johnsen et al., 2020). If a differentiated student-centred approach and active learning are to be promoted, policymakers in Malta should ensure that the curriculum is not heavily based on the content. On the other hand, teachers need to use the classroom time more efficiently. Firstly, they need to reflect on and evaluate the time spent doing things not related to understanding a mathematical concept. For example, a copy of the notes can be given to students instead of wasting time copying them from the board. Secondly, activities such as group work, hands-on and IBL should not be planned as extra activities. For instance, instead of being spoon-fed a mathematical concept, students can come up with the concept themselves through IBL, and thus the learning outcome would still take one lesson to cover.

Considering the lack of research on gifted students in Malta, additional studies are needed; firstly, to further understand the experiences of gifted students, and secondly, to improve teaching strategies and enhance gifted students' educational experiences. Findings of the current study were specific to gifted mathematics students. It would be interesting if similar studies are carried out in Malta with gifted students in other subject areas and with underachieving gifted students in order to understand the reason underlying their underachievement. It is also important to carry out research with teachers, as findings of the current study indicate that teachers might have difficulty addressing the needs of gifted students in mainstream classrooms. Listening to the teachers' daily challenges and experiences will help to plan adequate professional development that addresses the teachers' concerns and builds on their good practices.

Although the findings should be interpreted with caution due to the small size of the study, they shed light on the daily experiences of gifted mathematics students in mainstream classrooms in Malta. Hopefully, the findings will raise awareness about the need to provide gifted students with an intellectually

challenging environment commensurate with their ability and will stimulate educators to reflect on and explore alternative ways of teaching. It is likely that gifted students will be successful in their exams but that does not necessarily mean they are provided with meaningful experiences that maximise their potential.

Notes on Contributor

Maria Galea is a mathematics teacher. She graduated from the University of Malta in 2001 with a Bachelor's degree in Education and has since taught in a church school. She obtained her Master's degree in Inclusive Education from the University of the West of Scotland in 2021. Through the years she has experimented with different teaching strategies to cater for the different needs and abilities of all her students. She is a strong believer in a student-centred approach to teaching and learning.

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