Identifying gifted students' reported educational support needs in secondary education. A systematic review on students' views.

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Samenvatting:

Het is belangrijk om de meningen en ervaringen van hoogpresterende leerlingen te behandelen om zo mogelijke verbeterpunten te signaleren, aangezien de leerling degene is wat we onderzoeken en ontwikkelen ervaren. Dit belang wordt ook benadrukt in Artikel 12 van de Verenigde Naties Conventie over de Rechten van het Kind waarin het recht van een kind om zijn stem te laten horen en dat daarnaar geluisterd wordt in onderwerpen die invloed hebben op het kind. Desondanks is er in de literatuur een gat in de kennis over de meningen, benodigdheden en ervaringen van leerlingen en in het bijzonder hoogpresterende leerlingen. Dit fenomeen komt mogelijk omdat deze leerlingen vaak gezien worden als niet problematisch en dus geen extra ondersteuning nodig hebben. Uit eerder onderzoek blijkt dat hoogpresterende studenten wel sterk profiteren van extra ondersteuning en deze review probeert een overzicht te maken van wat er al wel bekend is in dit onderzoeksveld en aanbevelingen te maken over wat voor onderzoek nog nodig is om dit gat in onze kennis te vullen, daarnaast beoogt dit artikel om de stemmen van hoogpresterende studenten te laten horen voor onderzoekers, onderwijsprofessionals en programma ontwikkelaars. Deze systematische review analyseert 22 verschillende studies op het gebied van begaafde middelbare scholieren. Hierbij is gekeken naar 4 verschillende interventie vormen: inclusieve differentiatie in de klas, pull-out programma's, online onderwijs en gespecialiseerde scholen voor hoogpresterende of hoogbegaafde leerlingen. Uit deze review kwamen 3 hoofdthema’s naar boven: huiswerkbeleid, deskundigheid van docenten en de behoefte aan autonomie voor leerlingen. Wat betreft huiswerk werd er een behoefte van leerlingen gevonden aan moeilijker en niet meer huiswerk, over de deskundigheid zeiden leerlingen dat de docenten beter opgeleid moeten worden om hoogpresterende leerlingen te

onderwijzen en over de behoefte aan autonomie zeiden studenten dat ze meer autonomie zoeken in het kiezen van hun lesinhoud en de lessen die ze volgen. Naast deze bredere conclusies zijn er ook interventiespecifieke kritieken en pluspunten gevonden volgens leerlingen. Na aanleiding van dit onderzoek is de aanbeveling om meer vergelijkend onderzoek te doen tussen interventievormen om zo meer duidelijkheid te scheppen over welke vorm de voorkeur heeft van leerlingen, daarnaast waren de leerlingen wel overweldigend positief over de ondersteuning die ze kregen ondanks dat er wel duidelijke verbeterpunten zijn gevonden.

Introduction:

In the Salamanca Declaration (1997), an intent is voiced for all students to be able to learn together, stating that "All children should learn together, wherever possible, regardless of any difficulties or differences they may have. Inclusive schools must recognize and respond to the diverse needs of their students." According to this declaration gifted students should also be able to follow their educational track alongside other students. Also, in the Netherlands, an intent to reach inclusive education has been confirmed by the government when they signed the UN convention on the rights of persons with disabilities in 2007 and ratified it in 2016. Their first step towards this aim was made using the Wet Passend Onderwijs (2013) where, most importantly, it was decreed that every region should have the facilities to accommodate every type of student. Lastly, in 2015 the UN passed the Sustainable Goals Convention, aiming for every child to be able to get an education by 2030.

It is incredibly important to include student voices in the research we conduct in the educational field, students can offer unique insights into their educational experiences that we design and research and excluding these views create immense blind spots on the quality of the

interventions that we can offer students. The United Nations reaffirms this conclusion in the United Nations Convention on the Rights of the Child where, in 1989, they asserted the right for every child to be able to speak up and be listened to as one of the 4 main general principles in the convention. (Convention on the rights of the child, 1989). This article in the UNCRC also includes the right for children to be able to speak and be heard on their experiences in education, underscoring an explicit need for students to be included in research targeting their education. Additionally, including students in research has sometimes gone as far as having students co-author articles regarding their own education, all in order to get as close as possible to the primary source regarding student experiences. Using this method of including students has led to increasing student agency. This increase in agency has been linked to student learning and student motivation, leading to increased academic results and increasing positive feelings towards education by students (Stenalt & Lassesen, 2021; Cook-Sather, 2019).

Nevertheless, in the literature, there seems to be significantly less attention for gifted students in education compared to students with learning or educational challenges (Lo et al., 2021). This may be because gifted students are not seen as a high priority, as they are perceived as problem-free since they do not qualify for a disorder label or fall behind (Casey et al., 2011). As a result, teachers less frequently differentiate instruction for gifted students, even though these students may need more challenges in their education.

Additionally, there is even less research on what students themselves say they need. Most attention is given to topics such as teachers' experiences regarding interventions offered in schools (Opoku et al., 2023; Koca, 2023; EşsiZoğlu & ÇetiN, 2022; Casey et al., 2011). Furthermore, many articles focus on the wellbeing of gifted students (Podlogar et al., 2024;

Shaunessy-Dedrick & Suldo, 2024; Kalaji & Alborno, 2023). However these articles don't focus on student opinion or needs as they try to make an inventory of how the students feel about their education in general and focus more on mental illnesses or loneliness.

Therefore, this systematic literature review aims to explore what gifted students themselves say they need in terms of support. The research question of this study is: What educational needs do gifted students experience in secondary education and to what extent does the current received assistance support these needs? In order to answer this question it is important to clearly define the key concepts. Terms such as educational needs, giftedness and support and secondary education are important concepts in the rest of this review and are because of this reason further explored

Gifted students refers to students who display an unique ability to excel in academic or artistic fields. While articles studied in this review often simply used students included into gifted and talented classes as the inclusion criteria for their studies, it is prudent that I incorporate a more in depth definition to more clearly delineate the meaning of being gifted. To this end I would like to introduce a model created by S. Renzulli (1978) in which he introduces 3 concepts contributing to giftedness. These three concepts are: above average ability, task commitment and creativity. These concepts all individually equally contribute to being conceived as gifted and in this article gifted students will be regarded as having high amounts of these concepts, compared to their peers.

Educational needs refers to both the cognitive and emotional requirements of a gifted student which enable the student to excel in an educational setting. This can range from needing

increased structure in the classroom, silent places to study, an increased amount of coursework but can also include interaction with like-minded peers

The choice for this research design was made so that this review can provide an overview of the research done for researchers and for educational practitioners, as well as providing an overview of possible hurdles to overcome by intervention designers.

Methodology:

Search strategy and sources

To identify articles relevant to this topic, I first used Google scholar in order to gain familiarity with the subject andAdditionally, I reviewed the references of selected articles to identify further relevant literature. The search terms used in the ERIC database were: (student opinion OR student thoughts OR student attitudes OR student needs OR student requirements) AND (gifted students OR gifted OR gifted children OR giftedness OR talented OR high-ability students) AND (programme OR program OR intervention OR instruction OR aid). This literature review focuses on articles targeting student opinions and experiences, specifically regarding interventions targeting gifted or high performing students.

Inclusion and exclusion criteria

Several inclusion criteria guided the selection of articles. First, the article had to specifically explore the opinions of gifted students regarding the support they receive. Second, studies comparing different interventions based on gifted students' perspectives were eligible. Third, articles were included if they examined effective intervention elements from the viewpoint of the students themselves. Additionally, the target population had to consist of secondary school students (aged 12–18). Only peer-reviewed articles published between 2010 and 2025 were

considered. Finally, studies involving higher education students were also included if they reflected on their secondary school experiences.

Studies from all countries were included, with the assumption that gifted students universally require similar elements of support, even if these are provided to varying degrees in different educational systems.

Several exclusion criteria were applied to ensure the relevance and focus of the literature included in this review. First, studies involving twice-exceptional students, gifted individuals with co-occurring disabilities, were excluded, as their support needs differ significantly from those of the general gifted population. Second, articles in which student opinion was not a central focus of the research were omitted, even if they addressed gifted education more broadly. Third, topics for which fewer than three relevant studies could be identified were excluded, as insufficient literature would limit the validity of any conclusions drawn. Lastly, interventions focused solely on emotional development, such as social-emotional learning programs or psychological counseling, were not included, since the scope of this review is limited to educational support and instructional interventions.

For article selection, the title was first reviewed to determine potential relevance. If the title suggests a fit, the abstract is then assessed against the inclusion criteria. This process is repeated for all articles, after which the full texts of the remaining articles are reviewed to confirm their suitability for the literature review and introduced into a larger analysis table, which has been summarized in Table 2

Quality Assessment

For quality assessment, several criteria are considered, including the research design, the accuracy and validity of the measurement instrument, and the representativeness of the sample. Articles with relatively low evidence strength or quality will only be used if their findings are confirmed by higher-quality studies. If no such confirmation exists but the article contains important information, the limitations of the article will be explicitly mentioned. Higher-quality articles do not require additional support from other studies, although such corroboration is ideal it isn't required as these articles stand stronger on their own compared to lower-quality studies.

To make this quality assessment a checklist made by Protogerou and Hagger (2020) was utilised, this 20 part checklist is a fairly swift way to gain a good idea of the quality of study in the social sciences field. As an example, in Table 1 one of the articles in the review is examined for its quality using the procedure developed in Protogerou and Hagger (2020). After the quality assessment was done this article was found to be of questionable quality, since the percentage of items marked Yes was less than 75%, meaning its findings would have to be corroborated by at least one other articles' findings. This cut-off at 75% is arbitrary but supported by other general quality assurance tools, such as those developed by Glynn (2006).

Table 1

Quality Assessment of Thomson (2010)

N	Item	Yes/No/NA
1	Was the problem or phenomenon under investigation defined, described, and justified?	Yes
2	Was the population under investigation defined, described, and justified	Yes
3	Were specific research questions or hypotheses stated?	Yes
4	Were operational definitions of all study variables provided?	No

5	Were participant inclusion criteria stated?	Yes
6	Was the participant recruitment strategy described?	Yes
7	Was a justification/rationale for the sample size provided?	No
8	Was the attrition rate provided? (applies to cross-sectional and prospective studies)	NA
9	Was a method of treating attrition provided? (applies to cross-sectional and prospective studies)	NA
10	Were the data analysis techniques justified (i.e., was the link between hypotheses/aims/research questions and data analyses explained)?	No
11	Were the measures provided in the report (or in a supplement) in full?	No
12	Was evidence provided for the validity of all the measures (or instrument) used?	No
13	Was information provided about the person(s) who collected the data (e.g., training, expertise, other demographic characteristics)?	No
14	Was information provided about the context (e.g., place) of data collection?	No
15	Was information provided about the duration (or start and end date) of data collection?	No
16	Was the study sample described in terms of key demographic characteristics?	Yes
17	Was discussion of findings confined to the population from which the sample was drawn?	Yes
18	Were participants asked to provide (informed) consent or assent?	Yes
19	Were participants debriefed at the end of data collection?	No
20	Were funding sources or conflicts of interest disclosed?	Yes

Data Analysis

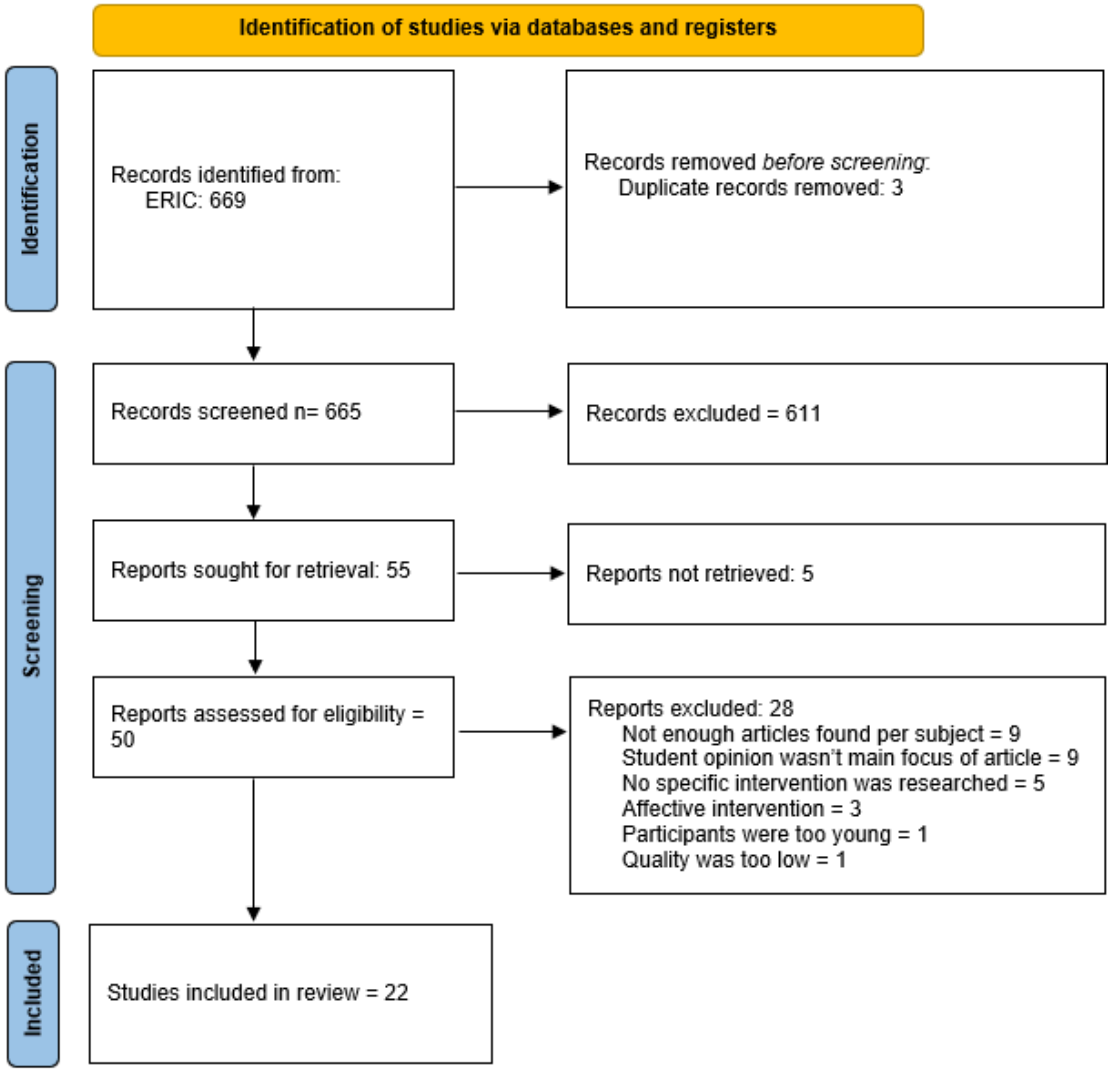
During data extraction, these concepts were tabulated, with each article indicating which concepts were addressed and the corresponding findings. These concepts were then combined and compared, using a thematic analysis approach. First, when the articles have been selected they will be read in order to further familiarize myself with the concepts and themes in each article. Articles will then be coded and those will then be organised into themes. These themes

were revisited and refined to correctly reflect the information that's given in the different articles. Themes were categorized based on the type of intervention they research. Articles were then analyzed in the context of other articles within the same theme, comparing findings and determining what findings are relevant based on the rest of the articles and the theme they have been sorted into.

On an article by article basis, the first thing done was to determine what intervention style the article described or researched. The second step was to determine the participants of the students, how many there were and if they fit into the targeted population. Then the country of origin was determined, after which the design type was determined and finally a quality assessment was done. If an article succeeded on the quality assessment and passed the inclusion and exclusion criteria the article was included and analyzed.

Figure 1

Flowchart of article selection



Results

22 studies were found in the literature search, which were from 8 different countries, including The United States of America (n= 7), Turkey (n= 7), Saudi Arabia (n=2), Germany (n= 2) and one article each from the United Kingdom, New Zealand, Austria and Chile. Out of these 22 studies the overwhelming majority used a qualitative research design (n= 14), as well as a significant number of articles deploying a quantitative research design (n= 7) and one study used

the mixed methods research design. Most commonly the data collection was done through a survey (n= 11), three studies used a literature review, three studies used interviews and the other four studies used multiple data collection methods.

All of these participants were students, their educational level ranging from middle school to college level students. Some of these studies also involved teachers or teacher assistants, however these results were not included, as this review specifically looks at student opinion and student voice. Additionally 3 studies analyzed pre-existing literature as their data collection method Results from these studies

In the review of the included articles 4 main intervention methods addressing gifted students' needs were identified. These are inclusive in class differentiation (n= 5), Pull-out programmes or withdrawal programmes (n= 5), online education (n= 5) and specialized gifted schools (n= 7). 9 articles were removed because not enough articles covered their specific subjects, as a minimum of 3 articles per subject was established, 9 articles were not included because they didn’t study students' perceptions and experiences after closer investigation. Another 5 articles were removed because no specific intervention or support structure was researched, 3 articles were removed because they studied an affective intervention which were excluded because they

Table 2

Summary of findings per articles

Reference	Country	Intervention style	Research design	Participants	General Findings
VanTassel-Baska and Brown (2022)	United States	In-class differentiation	Literature Review	Literature.	Students expressed satisfaction with accelerated learning but noted issues with teacher expectations, selection fairness, and a desire for more autonomy and project-based learning.
McGrath (2018)	United Kingdom	In-class differentiation	Survey	16 students	Students often reported not having enough challenges in school, expressing a need for accelerated schooling and accelerated classes with older students.
Fisher and Frey (2012)	United States	In-class differentiation	Observations, interviews and focus groups	48 students	Students appreciated teacher modelling and group work for improving understanding and real-world relevance. Homework caused mixed feelings, with stress from volume and deadlines. Clear daily learning objectives were seen as helpful.
Ziernwald et al. (2022)	Germany	In-class differentiation	Literature review	Literature	Students viewed the differentiated curriculum positively, describing it as challenging, engaging, and relevant to their interests, studies, and real-world applications. They supported its continued use.
Gomez-Arizaga et al. (2020)	Chile	In-class differentiation	Photography and interviews	12 students	Students felt insufficiently challenged, with repetitive content and little real-life relevance. They preferred engaging, game-based activities and individual projects, and reported frequent boredom due to excess free time.

Balentyne and Varga (2017)	United States of America	Online Education	Survey	23 students	A strong link between math achievement and student input highlights the importance of involving student voice in online teaching design, with outcomes also shaped by teachers and curriculum quality.
Thomson (2010)	United States of America	Online Education	Interview and survey	3 students interviewed 65 students surveyed	Students valued prompt, clear feedback and engaging teachers but missed informal classroom dynamics. They appreciated flexible pacing and unique content but struggled with delayed support, motivation, and time management.
Naghdi and Behpajooh (2019)	United States of America	Online Education	Survey and focus group	24 students	Students valued attending physical school while accessing courses unavailable in regular schools. They appreciated in-person support, self-directed learning, early high school credits, and increased motivation through subject choice.
Swan et al. (2015)	Turkey	Online Education	Survey	190 students	Most metaphors reflected a positive view of distance education among gifted students, though some negative ones highlighted issues with limited interaction with peers and teachers.
Eristi (2012)	Turkey	Online Education	Survey	46 students	Students overwhelmingly disliked the concept of e-learning, although they had not experienced it firsthand and formed opinions based only on information provided by researchers
Preckel et al. (2010)	Austria	Pull-out programs	Standardized test and survey	186 students	Students with higher academic self-concept felt less bored. Ability grouping lowered students' self-concept but did not increase boredom overall, shifting boredom

					causes from underchallenge to overchallenge instead.
Bate et al. (2012)	New Zealand	Pull-out programs	Literature review	Unknown	Students benefit from interventions with pre-planned curricula, which offer structure and planned learning. They feel sufficiently challenged and appreciate encouragement to think creatively.
Testa (2010)	United States of America	Pull-out programs	Survey	304 students	The voluntary program attracted students seeking greater challenge and learning. Most felt better challenged and more prepared, but some reported too heavy a course load, excessive challenge, and pressure from high expectations.
Feuchter and Preckel (2021)	Germany	Pull-out programs	Survey	1861 students	Boredom rose in both gifted and regular classes, though more slowly in gifted classes. Ability grouping didn't significantly reduce boredom, prompting a call for alternative boredom-reducing strategies in education.
Desmet et al. (2023)	United States of America	Pull-out programmes	Survey	25 students	Students found the course safe, satisfying, and optimally challenging, which supported motivation. Engagement rose with local experts and hands-on activities. Many felt more confident and interested in STEM or cybersecurity careers.
O. Muammar (2024)	Saudi Arabia	Specialized gifted schools	Survey	356 students	Student satisfaction was most influenced by logistics and soft-skills programs, with science content playing a smaller role. Good facilities or managing expectations is key, though other factors likely matter too.
O. M. Muammar and Alfaiz (2023)	Saudi Arabia	Specialized gifted schools	Survey	172 students	This study confirms earlier findings: logistical factors and social programs are key to student satisfaction. Emotional support, food options, and sleeping

					arrangements also significantly influence perceived program quality.
Özarslan and Çetin (2018)	Turkey	Specialized gifted schools	Survey	26 students	Student motivation increases when content aligns with their interests. Gifted students often show different preferences than peers, highlighting the value of tailoring curricula to individual or group interests.
Özdemir and Bostan (2019)	Turkey	Specialized gifted schools	Interviews	11 students	Students expressed two key needs: intellectually, they desired more challenging and engaging tasks; emotionally, they wanted recognition and individualized treatment rather than being treated the same as regular students.
I. Satmaz et al. (2018)	Turkey	Specialized gifted schools	Interviews	52 students	Students overwhelmingly viewed the SAC positively, with 51 out of 52 using metaphors that described it as a safe and relaxing space, indicating strong emotional support and comfort in that environment.
Akkanat and Gökdere (2018)	Turkey	Specialized gifted schools	Survey	698 students	Perceived school climate and academic involvement predicted motivation and science creativity well but not science ability, suggesting a missing factor. Overall, students felt the gifted school supported their learning effectively.
İ. Satmaz (2023)	Turkey	Specialized gifted schools	Interviews	12 students	Students criticized teacher quality, poor organization, and financial barriers in the gifted center. Despite this, they valued lasting skills gained, like report writing and scientific/artistic awareness.

Inclusive in class differentiation

In class differentiation is the progress where gifted or struggling students remain in the regular class and receive additional support from the teacher. The teacher in practice creates different teaching methods and schedules for children according to their needs. Differentiation in the classroom is often cited as one of the best methods of personalizing the education experience of gifted children in high school, however student opinion seems fairly divided on the intervention.

One of the main factors of student satisfaction with differentiated instruction is, according to Van-Taska and Brown (2022), teacher quality. Teachers who demonstrated empathy and adapted content effectively were more likely to satisfy student needs. For example, students provided positive feedback when teachers modeled their own thought processes when solving problems. This technique is known as teacher modeling, which allows students to compare their own reasoning to that of the teacher (Fisher & Frey, 2012). Some concerns were also raised by students, as they highlighted that they felt the selection procedures for differentiated instruction were not foolproof, with a large number of students saying that they knew people who would've been a better fit in the instruction than other students. This feeling of unfairness might lead to decreasing motivation among the students that felt unfairly burdened or excluded. Research by McGrath (2018) also supports this notion, as the same results were found in a study concerning students in Northern Ireland.

A recurring theme in the articles were students telling researchers that they had issues with the form of homework they received. Students often remarked that they were fine with receiving homework as long as the volume of homework was reasonable, which for at least one student

resulted in them intentionally doing worse at tasks to receive less homework. This student is cited as saying: “I don’t really like teachers to know that I’m smart because then they want me to do a lot of extra work that really doesn’t matter.” (Fisher & Frey, 2012, p. 9).

Also in Fisher and Frey (2012) students reaffirm findings in the article written by Gomez-Arizaga et al. (2020), revealing that they too feel that homework can be enjoyable as long as they can connect it to real world activities and finding more fulfillment and satisfaction when succeeding on a higher difficulty level of homework instead of a high volume of easier homework. Researchers also noted student dissatisfaction in the amount of challenge they received, highlighting a possible pitfall in differentiated instruction but also an area for improvement, providing students with more challenging workload if they seem to get bored or distracted of the current course load might be an effective way to decrease these symptoms (Gomez-Arizaga et al., 2020)

Further feedback delivered by students regarding group projects compared to individual work can be characterized as conflicting, some students say they prefer group work, others prefer to work alone. One student for example told researchers they enjoy group work more because it shows different ways of working and thinking to them commenting: “I like to hear what other people think because it really makes it solid in my mind.” (Fisher & Frey, 2012, p. 6).

Another student however remarked they did not like to work in groups as, in an inclusive setting, they often had to do most or all of the work (Gomez-Arizaga et al., 2020). Students also remarked that they enjoyed learning through games, saying they were better able to concentrate on the material and had a higher degree of motivation to finish their work. This leaning on gifted students during group projects might be a result of the mixed ability nature of the classes,

meaning students that experience issues with unfairly balanced workloads during group projects might be better served in a pull-out program where they would be surrounded by more equally performing peers.

In conclusion, inclusive differentiation has the potential to enhance student performance and student attention, however its effectiveness is heavily influenced by teacher expertise, workload management and selection progresses perceived as fair. Without these factors positively impacting perceptions, the method risks increasing dissatisfaction among gifted students.

Pull out programmes

Pull out programmes have long been used as a method to increase gifted students motivation and sense of belonging in their school, and have often been cited by practitioners in education to be an effective way of reducing boredom in gifted students, and have also often been cited in academic literature as being effective interventions in reducing boredom and offer intellectual stimulation in (Bar-On, 2007; Plucker et al., 2004).

Academic self concept and boredom were found to be negatively linked, meaning that boredom decreased as academic self concept improved this phenomenon has been dubbed the Big Fish Little Pond effect, however no increase in boredom was found as students were placed in gifted classes, even though their academic self concept did decrease, after possibly rising because of being placed in gifted education. Boredom in these students was explained by them because they felt over challenged in the gifted classes and underchallenged in the gifted classes, both reasons increased over time as did the frequency of boredom being reported by these students (Preckel et al., 2010).

Gifted students in the same study also reported being bored more often than students in gifted classes, however students in gifted classes still reported being bored often, the main difference being that gifted students in regular classes reported boredom because of being underchallenged more often than the students in the gifted classes (Preckel et al., 2010).

In a longitudinal study done by Feuchter and Preckel (2021) it was found that there was not enough evidence for reducing boredom through ability grouping, finding that boredom increased in general in both gifted groupings and regular groupings. Small effects were found but they were not significant and thus the belief that pull-out programmes are a good instrument to reduce boredom in gifted students was contradicted. This contradiction is in line with other research such as that done by Preckel et al. (2010) and Hornstra et al. (2017)

Gifted students often reported wanting to join a pull-out programme because they felt underchallenged in the regular education they received (Testa, 2010; Preckel et al., 2010). Students commonly expressed feeling more challenged in these withdrawal programmes. However they did report having to do too much coursework and felt a lot of pressure from higher expectations. In Testa (2010) they also reported feeling over challenged, underscoring a need to still closely monitor students' academic functioning and capabilities in comparison to the offered coursework.

Results from a study following a specific pull-out program regarding cybersecurity found that pull-out programs were effective in improving general interest in the subject and students reported feeling more inclined to pursue a career in subjects like STEM or more specifically cybersecurity. Involving local subject experts and providing hands-on exercises also increased the general interest and engagement in the subject greatly (Desmet et al., 2023).

These results point to a possible more subject specific role for pull-out programmes since the often cited aim of preventing boredom in regular education doesn't seem to hold up in research done. Pull-out programs also seem to have a negative impact on academic self concept which can result in lower grades (Marsh et al., 2008; Valentine et al., 2004), and decreased motivation in students (Marsh et al., 2005).

In conclusion, in a more subject-specific short term role students might benefit from the short term increase in academic self concept found by Preckel et al. (2010) and also be more engaged and interested in the subject followed in the gifted education (Desmet et al., 2023). Therefore pull-out programmes might be more effective in decreasing boredom when offered in addition to regular education.

Online Education

Online education is most often used in gifted education when teachers in the regular school aren't able to provide sufficient instruction to the students, online education often takes the form of an accelerational intervention, meaning that students following online education often follow coursework meant for older students in the regular track. A middle school student might follow high school level coursework or a high school student might follow coursework at a college level (Queen & Lewis, 2011).

In a case study by Swan et al. (2015) following a high school in Florida, students were following a virtual education program which allowed students to earn high school credit in middle school, these students participated in a classroom at their regular local middle school. They were taught by the teacher in the virtual program but also had a separate teacher present in the computer lab on location. Students reported finding great comfort in having a different

teacher present in person for them to ask questions to and receive additional instruction. Students were also able to get aid in planning and setting their own pace through the face-to-face teacher, as she would track students' progress and help students that are falling behind. Students also reported great satisfaction in being able to choose the course they would follow themselves, greatly increasing their autonomy in forming their learning experience.

In another study by Thomson (2010) students were followed in a completely online experience, filling in a survey and being interviewed, students reported being overwhelmingly positive about their experiences however they reported some unique problems due to their fully online education experience. Specifically they missed knowing the teacher personally and not meeting them in person, reporting that true connection between the teacher and student was not easy to make, they also reported missing the more informal and entertaining setting of the regular classroom. These findings are corroborated by other studies, where students reported missing the interaction with peers and the teacher (Eristi, 2012; Muzammil et al., 2020)

Other disadvantages of online education as reported by students are that they are very reliant on frequent and prompt interaction with the online teacher, as this is sometimes a problem with some designs of the education. Specifically they said they found it difficult to bring questions into words, as they would have to email their questions or post them on a question board, whereas in physical education it might be easier for the teacher to understand the question as they'd be able to see the progress of the student immediately as they asked the question (Thomson, 2010).

In a study where gifted students were asked to provide metaphors of their views of e-learning and online education, students expressed an overwhelming desire to keep learning

physically, citing fears of not being able to connect with peers or the teacher, or the program being of low quality. The study consisted of participants that had not themselves participated in a form of online education but instead were informed about online education by one of the researchers before they provided the metaphors regarding their view of online education. This illustrates an initial hostility students might feel to the concept of online education, especially when the online education would largely or completely replace the regular face-to-face education (Eristi, 2012).

A common thread between studies was that regarding student-content interaction, students often appreciated the freedom in scheduling and their ability to pace their own schoolwork, as well as the ability to follow coursework that they wouldn't have been able to follow in regular education (Thomson, 2010; Swan et al., 2015) . However this freedom did come with disadvantages, as a sizable amount of students also reported problems with motivation and time management, one of the students is reported as saying "you have to be motivated to do the assignments and study for the tests, because it's not like a normal class where you're there every day and you have deadlines" and another student commenting "Time Management!!!! As the girl who never has to study in regular school, devoting time to learning the information is a struggle" (Thomson, 2010).

These comments highlight a need for students to have more structure in their learning environment, which is a finding also found in other articles where students following a more planned schedule reported having high feelings of belonging and a high motivation for following the course (Bate et al., 2012).

Looking at these articles online education seems like an effective way to educate gifted students, however some major pitfalls were also identified. So while students reported enjoying the freedom they gained in planning their coursework, time management and a lack of sufficient feedback were often listed as disadvantages in online education. Taking this into consideration, a form of online education as applied in the Florida school discussed at the start of this section seems to incorporate a lot of advantages of online education while giving more instructional support and also facilitating a more structured learning environment. Additionally to online education, schools should consider adding study skills to their curriculum, in order to account for the students that reported having trouble with time management and dealing with deadlines successfully.

Specialized gifted schools

A common way for countries to differentiate their education between gifted students and regular needs students is to create specialized schools for the gifted, findings point to differing experiences among students enrolled in these schools.

Two articles pointed out that amenities offered by these gifted schools are very important, these amenities include things such as housing, transportation and food arrangements, but also the quality of the classrooms, bathrooms and other facilities. These articles found that students were most likely to recommend these learning activities when they were satisfied with these amenities. Satisfaction is the product of expectations and reality so one way of improving satisfaction might also be managing expectations more realistically instead of just increasing and improving amenities (Muammar, 2024; O. M. Muammar & Alfaiz, 2023).

This likelihood for recommendation of the students was also closely linked to the soft skills programs that were provided at the school, these are classes where social and emotional development is encouraged through group projects and collaborative learning. However about 32% of variance was explained by the soft skills classes and facilities and amenities offered, so there are most likely more factors at play in predicting the satisfaction of students at a gifted school program. (Muammar, 2024; Muammar & Alfaiz, 2023).

In Turkey, extensive research has been conducted regarding the student views on their education at so called Science and Art Centers (SAC). These SAC's are schools specifically created for the education of high performing students. Students at these schools often express positive feelings about their education, where one study focused on metaphors students produced regarding the SAC and students overwhelmingly supported the SAC on their educational needs, with most students regarding the SAC as a safe and relaxing environment (Satmaz et al., 2018).

Another study also conducted research on this subject, finding that students in the center rated their intellectual and emotional needs as sufficiently fulfilled. Regarding intellectual needs this article focuses on the perception and anticipations of homework, specifically students report saying they didn't like that the homework was often easy and in large quantities, saying things like "When I first look at the problems, I know I can solve it easily. I don't want to spend my time on such easy questions" (Özdemir & Bostan, 2019, p. 8). All students were in agreement that they would rather receive harder homework than easy homework and want to be intellectually challenged by their teacher. One student was cited as saying that "he (the teacher) should give me a brain boner" (Özdemir & Bostan, 2019, p. 9). Regarding their emotional needs they said they are generally satisfied but that they are often treated the same as other children

their age by teachers and parents, however they would rather be treated differently as they are not like their peers (Özdemir & Bostan, 2019)

Students also reported several negative experiences in their education experiences in a gifted school. Here students expressed that their teachers were not well educated on teaching gifted children as they often tried to treat them the same as other children even when the students felt different. Students and their parents also often experienced financial difficulties when they attended the gifted school as they often weren't included in the state sponsored educational facilities and were often funded by parent contributions. However in the same article students also acknowledged that they still made use of the skills learned in the gifted school programs, such as report making and scientific and artistic awareness (Satmaz, 2023).

Discussion

The present study has found multiple general themes in the support students receive across different intervention styles, as well as a couple intervention-specific needs that were raised by the students in the studies included. Student opinions of four intervention styles were investigated across 22 articles. Collectively results show multiple issues students raise across these educational support styles, these seem to be: homework allocation, teacher aptitude and student autonomy. Program-specific thoughts about the intervention styles were also found in the literature.

The research question of this paper was: What do gifted students say they still need in their support they receive as gifted students in secondary school education? In general students seem to be positive about the support they receive even though across intervention styles they have

multiple parts of the educational support they are dissatisfied about. These can be broadly sorted into homework concerns, teacher aptitude concerns and student autonomy concerns.

Homework

Across multiple intervention styles the issue of homework in gifted education was raised with multiple students conveying a need for less and harder homework. Homework is a difficult thing to balance for teachers as multiple articles have had conflicting results on the perceptions of homework in education for gifted students. Kitsantas et al. (2017) produced results that suggest students are receiving homework that was too difficult which, paired with demanding teachers, had a negative effect on academic and social wellbeing. Meanwhile Er et al. (2022) came to a generally positive conclusion where students said they were currently positive about the homework they received. In relation to this context the results of this study seem out of place as the scientific literature suggests that gifted students are receiving sufficient homework and are generally satisfied with the amount of homework and difficulty. However the scientific community is still somewhat divided on the amount of homework, the type of homework and at what age homework should be given out to students, highlighting a need for student specific differentiation on the amount and type of homework. A gifted student might not benefit much from higher amounts of homework and would rather receive more difficult homework, while regular or underperforming students might benefit more from an increased amount of easier homework (Cooper et al., 1998; Chang et al., 2014; Suárez et al., 2019; Yavich & Davidovitch, 2020).

This discrepancy in this review could be explained by the nature of the articles involved in this study. It is possible that the needs of the students questioned were not yet matched by their

homework assignments while the students in the conflicting articles had their homework better matched. These conflicting results highlight the need for educators to review the homework they hand out with the students and differentiate the homework they hand out based on the skill level of the class and students they teach (Keane et al., 2019)

Teacher aptitude.

On the matter of teacher aptitude many students supported the idea that teachers were not as well prepared for teaching gifted students as the students would have liked or that in the case of online schooling, local schools weren't able to provide sufficient facilities for the gifted students to be assisted at their own school. This can be expected as it is well known that the perceptions of courses can lean heavily on the proficiency of the teacher in that subject combined with their teaching skills (Sumyadi et al., 2020; Thijssen et al., 2022; Hanushek et al., 2019). Students reporting dissatisfaction with their education therefore could be partially explained by them not having proficient teachers. On top of that, gifted students require a different form of teaching than regular students, these students often need more autonomy in choosing their own coursework and contents, and they get bored quicker than regular students. When these needs are not sufficiently met by their teachers this might result in them showing dissatisfaction with their teachers and the education these teachers received (Ziernwald et al., 2022; Yuen et al., 2016).

Research by Ziernwald et al. (2022) shows that teachers do not often apply differentiation in mixed ability classrooms even though teachers and students agree that it would have a generally positive impact on their education. Additionally, according to research by Yuen et al. (2016) most gifted students are educated in mixed ability classrooms, and if those students in mixed

classrooms often don't get the support they need it is no surprise that in this study we can also find students that have issues with the training that their teachers have received.

Student autonomy

A common thread in this study has been that students either greatly benefit from the autonomy they experience such as when they receive online education and are allowed to choose their own courses. However at the same time students in mixed ability classrooms and gifted schools raise concerns about the course load they receive, such as the content not being representative of their life after school, the content not going further into detail and leaving everything surface level or experiencing a general disinterest in the courseload. So while autonomy is a clear factor, dissatisfaction with the curriculum in general or lack of relevance could stem from both not enough challenge or a lack of choice and freedom in forming the learning experience. This can be brought back to the self determination theory by Deci and Ryan (1985) which positions the need for autonomy as one of the basic needs of a person for them to develop intrinsic motivation, therefore increasing the autonomy of gifted students might increase motivation and decrease boredom for gifted students, who already have a higher risk of getting bored of regular education. This higher chance of boredom is described in the Little Pond Big Fish theory which was developed by Marsh (1987) which claimed that academic self-concept in gifted children was lower when included in gifted classes without regular students, but also that the chance of boredom decreased in these students. This highlights a need for gifted students to receive differentiated instruction to prevent boredom. Research done by Guay (2021) also reflects a need for autonomy in gifted students, and it supports the need of students for more autonomy centered interventions and course content.

This is also one of the strengths of online education, as students can often choose the courses and subjects they want to follow themselves. However these needs of students can also be incorporated into the other intervention methods by introducing more autonomy supporting ways of teaching, letting students make more choices in their learning journey, even if this doesn't fully allow them to choose the subjects they wish to follow (Stefanou et al., 2004).

Unexpected results

The most significant unexpected results are the critical attitude that students had on mixed ability inclusive classrooms, as this intervention style is often highly lauded for its positive effects and student perceptions (Ziernwald et al., 2022; Ninkov, 2020; Shayshon et al., 2014). However in this study students came up with several problems with differentiated classrooms. A possible explanation for this discrepancy is that the classes weren't properly differentiated as is often the case as also highlighted in the study by Ziernwald (2022) or that students might have issues with their teachers as discussed earlier. Both of these issues can also explain the more negative feedback students gave on the subject, however students also provided some negative feedback on the other interventions so the feedback on inclusive in class differentiation could still fit with the general theme of existing literature.

Conclusion

What educational needs do gifted students experience in secondary education and to what extent does the current received assistance support these needs? To answer this question the most important takeaway from this article should be that while students seem overwhelmingly positive about the support they are already receiving, there are some definite and pressing matters that need to be addressed in order to improve the learning experience of gifted students.

As discussed earlier three main areas of improvement were ascertained, teacher aptitude, student autonomy and homework allocation. Regarding teacher aptitude students required more teachers that were specifically trained in the education of gifted students. Students told researchers that they required more autonomy in selecting additional courses they wanted to follow, which was also reiterated in their support of online education, as they greatly enjoyed the freedom of choosing subjects when following online classes.

Difficulties in researching this subject were most notably the diffuse spread of articles and a lack of comparative studies. No studies included in this review compared the different intervention styles on characteristics which made it difficult to compare the different opinions of students on these intervention styles. Another difficulty for this review has been the lack of diversity for the specialized gifted school intervention as 2 articles came from Saudi-Arabia which examined 1 school twice and the other 5 articles were all based out of Turkey. This could present a skewed perspective on student perceptions and make it difficult to generalize the results for other gifted students around the world. On top of this almost all articles were done using data from just one school or program, which increases the influence of outside confounding factors, which also makes it more difficult to make assertions about what these articles research.

In terms of follow-up research I strongly recommend conducting more research in general as this field hasn't been very thoroughly researched as well as specifically conducting more comparative studies comparing different intervention styles side to side in order to paint a more clear picture for lawmakers and intervention designers on how to properly provide sufficient education for gifted students. Additionally almost all articles in this review were researched based off of a single school or program, which greatly increases possible outside influences such

as teacher quality, economic problems or successes in the area and other confounding factors. This general trend of small-scale studies makes it difficult to create generalizable theories and answer important questions regarding gifted students'education.

This study provides an important overview of an often overlooked perspective from the students, since teacher and parent perspectives and opinions have been thoroughly covered this study provides clarity in an otherwise difficult to research subject.

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