A Case Study of Provision for Gifted Students in Stem Subjects of a Bilingual Private Secondary School in Madrid

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Article

A Case Study of Provision for Gifted Students in Stem Subjects of a Bilingual Private Secondary School in Madrid

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Abstract

This study examines how gifted students in STEM subjects are identified and supported at Seafarers College, a bilingual Catholic boys' secondary school in Madrid. Using a participatory action research (PAR) methodology within a constructivist paradigm, data were collected through interviews, observations, focus groups and online questionnaires with teachers, students, and parents. The theoretical framework draws on the Three-Ring Model of giftedness to conceptualise giftedness and incorporates Critical Race Theory alongside Freire's notion of education as liberation to address issues of equity and empowerment. Findings reveal that provision for gifted learners is minimal at Seafarers College. Identification tends to be reactive and largely parent-driven, and classroom pedagogy remains exam-oriented, teacher-led, and non-differentiated. Moreover, the bilingual setting further complicates gifted identification, often privileging dominant-language speakers. The study concludes that effectively supporting gifted students in such contexts requires not only culturally responsive pedagogy and structural reform, but also greater teacher agency and a shift from a compliance-driven culture to one of collaboration.

Keywords: gifted education; bilingual education; STEM education; participatory action research; critical race theory; culturally responsive pedagogy

1. Introduction

This study provides a critical examination of how gifted students in STEM are supported within a bilingual secondary school context. The overarching purpose is to investigate and co-construct, with stakeholders, a model of support for gifted STEM students at Seafarers College that could inform practice in similar settings.

1.1. Giftedness

Neuroscience suggests that exceptional ability, or "giftedness," arises from a dynamic collaboration of distinct brain regions (Just & Varma, 2007), and contemporary theorists concur that individuals possess unique "gifts" across diverse domains – from mathematics and science to languages, arts, leadership, and interpersonal skills (Gagné, 2011; Renzulli, 2012; Sternberg, 2003). Whether these potential gifts flourish depends largely on environmental opportunities, cultural values, quality of instruction, and motivation (Renzulli, 2012). When a learner's gifts are not cultivated, underachievement can result. Both intrapersonal traits and contextual factors act as catalysts that may either hinder or magnify a student's potential (Gagné, 2011), with schools, teachers, and peers thus playing a pivotal role, they can either stifle or foster the development of a student's abilities (Renzulli, 2012). The impact of these factors is especially pronounced in STEM fields, where even naturally curious gifted students can become disengaged if their learning environment is monotonous or unchallenging (Gagné, 2011).

Gifted education in STEM sits at the intersection of several complex challenges, especially in bilingual settings. Research in science education shows that gifted students often turn away from

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STEM subjects when instruction relies too heavily on rote learning, recall-based assessment, and passive routines (Gagné, 2011). Watters & Diezmann (2003) note that gifted learners in science need meaningful enrichment and intellectual challenge within the regular school program to reach their full potential; without such support, even high-interest students may lose motivation. Educational systems must therefore provide stimulating experiences that promote abstract thinking, creativity, and problem-solving for gifted learners in STEM. Simply offering extra-curricular activities or accelerating content is insufficient – in-class differentiation and opportunities to apply knowledge in novel ways are key (Watters & Diezmann, 2003). Failure to address these needs can prevent gifted students from realising their potential. Without appropriate challenges, many able learners underperform under unfavourable conditions or a lack of support (Ford, 2003); numerous high-ability students become "gifted underachievers" when their school environments fail to recognise and nourish their talents (Ford, 2003).

1.2. Identification of Gifted Students in Spain

The challenge of identifying gifted students is both global and acute in Spain's education system. While experts agree that using multiple criteria is essential for capturing the broad spectrum of giftedness (Baldwin, 2005; Plucker et al., 2004; VanTassel-Baska & MacFarlane, 2008), in practice the number and type of tests vary widely (e.g., WISC-IV, Raven's Matrices, K-BIT) – as well as checklists like the questionnaire by Cao & Fernández (2005). In addition, testing conditions differ widely were some students are tested by school personnel; others go to external clinics. Research advocates incorporating teacher nominations, structured or unstructured, into the identification process (Siegle et al., 2014), since teachers – given sufficient observation time, training, and a list of characteristics – can recognise advanced development in students (Chan, 2002; Johnsen, 2012).

In the Spanish context gifted students are estimated to comprise roughly 2–3% of the population, yet a large proportion remain unrecognised and unsupported (Tourón & Reyero, 2003). Data from Spain's Ministry of Education indicate that in certain regions over 90% of highly capable students go undetected, reflecting a serious gap in identification and an attendant loss of potential (Figueroa et al., 2023). There is, therefore, a clear need to improve the identification of gifted learners and to develop school practices that nurture their abilities – particularly in STEM subjects, which are critical for innovation and societal progress.

However, in Spanish schools, classroom teachers are seldom meaningfully involved in identifying gifted students. Often, a student is formally identified as gifted only after external evaluation, and when that happens, the school leadership may inform the teaching staff but provide little follow-up support or guidance to teachers on what to do next (VanTassel-Baska & MacFarlane, 2008). In short, identification is inconsistent and frequently reactive rather than proactive. The fragmented approach means that many gifted learners remain invisible in the classroom, and those who are identified receive uneven support (VanTassel-Baska & MacFarlane, 2008). Consequently, gifted students in Spain can find their needs unmet, which, as noted, may lead to boredom, disengagement, or underachievement in subjects like STEM where continuous challenge is crucial (VanTassel-Baska & MacFarlane, 2008).

1.3. Bilingual Education and Giftedness in Spain

Spain has invested heavily in bilingual programs over the past two decades, and the bilingual education context adds an additional layer of complexity. In the region of Madrid, bilingual education is implemented via two intensity tracks, a "high intensity" track where most content subjects are taught in English, and a "low intensity" track requiring at least one non-language subject in English plus increased hours of English language classes (Dobson, Murillo, & Johnstone, 2010). After more than 15 years, evaluations have shown notable gains in students' English proficiency (Hidalgo-McCabe & Tompkins, 2024). However, researchers have raised concerns that bilingual programs might slow content learning in subjects like math and science for some students (Sotoca & Muñoz, 2015). Indeed, evidence suggests that students in bilingual schools in Spain progress more

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slowly in STEM subjects than their peers in monolingual schools, even as their foreign language skills improve (Brindusa et al., 2016; Sotoca & Muñoz, 2015). Moreover, Brindusa, Cabrales, and Carro (2016) note that bilingual schools often "teach to the average," lacking clear strategies for supporting learners at the extremes – those with special educational needs and those identified as gifted. In other words, the push for broad bilingual competence may have come at the expense of differentiated instruction (Brindusa et al., 2016).

Teachers in Madrid's bilingual schools often receive insufficient training in integrating language and content, leading many to simply teach their subject in English using traditional lecture methods with little adaptation, resulting in superficial learning and frustrated teachers and students (Hidalgo-McCabe & Tompkins, 2024). Golden (2024) provides a poignant example, a student in a U.S. bilingual program being admonished to "say it again in English," illustrating how some models treat the home language as a deficiency rather than an asset. Such subtractive approaches undermine the promise of additive bilingualism. The implication for gifted education is significant, if gifted bilingual students are taught in rigid English-only environments that neither leverage their native language nor adapt to their advanced learning pace, these students may become disengaged or under-identified. Indeed, linguistic bias in identifying giftedness is well-documented (Ford, 2013). Thus, to equitably identify and serve gifted students in a bilingual context, schools must ensure that language proficiency is not a barrier to recognising intellectual talent.

1.4. The Case Study Setting: Seafarers College

These national trends and challenges manifest in the specific institutional context of this study; Seafarers College, a pseudonym for the school where the study is conducted, a private all boys Catholic bilingual school in central Spain. The College was founded a few years ago under the guidance of a religious order, building upon their experience running other schools in Spain. Seafarers now offer the full Spanish primary and compulsory secondary curriculum and has just introduced the first year of Bachillerato, post-compulsory secondary education. As a bilingual institution, Seafarers uses both Spanish and English as languages of instruction, and its International Baccalaureate accreditation underscores the dual-language approach.

In the words of the College's founders, true education should help students integrate knowledge with meaning and purpose – "man is only truly man if he learns to inquire about the ultimate meaning of his journey" (Granados & Granados, 2009). It was the appealing vision of a holistic, values-based education that drew me to Seafarers College as a teacher and researcher. I joined the faculty in 2021, teaching secondary Biology, Chemistry, Physics, and English, encouraged by the school's stated commitment to challenging students with a rigorous curriculum that fosters critical thinking and innovation. During recruitment, the director stressed the importance of "inspirar un liderazgo innovador", "inspiring innovative leadership" and cultivating each student's unique gifts – a perspective reflected in Granados & Granados (2009).

Once I began teaching at Seafarers, however, I observed a growing gap between the school's philosophical ideals and the on-the-ground reality. The bilingual program, for instance, turned out to be narrowly focused on achieving external English qualifications. From early on, students were intensively prepared for Cambridge English exams, levels B1, B2, C1, largely due to parental pressure to obtain these certificates as status markers. As a result, the broader goals of bilingual education – such as broadening students' cultural horizons or enhancing cognitive flexibility – were sidelined. In staff meetings, success was defined by how quickly students earned these certificates, clashing with the founders' claim that "what distinguishes a school is not academic excellence, bilingualism, or extraordinary activities" alone (Granados and Granados, 2009).

My convictions about bilingual education were shaken. I had always believed that bilingual programs should foster cross-cultural understanding, communication skills, and personal growth, but at Seafarers the bilingual curriculum devolved into a mere exam-preparation track. I began to question which type of bilingual program the leadership truly intended to promote and, more importantly, why – a question that later became part of my research interest. There were other stark

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contradictions. The school professed a commitment to each student developing at his own pace and possessing unique talents. Yet I was explicitly instructed by the deputy director that "we teach to the middle."

Although Seafarers' leadership acknowledged giftedness, the term was vague and rarely translated into support. "Enrichment" at the school meant general-interest clubs such as gardening, rather than rigorous curricular extensions, and regular classes offered no differentiation. As a new teacher, my attempts to extend learning for high achievers ran into pressure to "teach to the middle," clashing with Granados & Granados's call for education showing a "predilection for each person" and for teachers to act as mentor-guides (Granados & Granados, 2009). I questioned how uniform pedagogy could cultivate individual gifts.

The school's structural response was a mentorship scheme, each religious-community teacher met weekly with three assigned students. These meetings became perfunctory, disrupted lessons, and served as channels for student complaints; on two occasions teachers were dismissed mid-year after such complaints, without observation or support, eroding authority and morale. Although Granados & Granados (2009) emphasise an "asymmetry" with teachers as authoritative guides, at Seafarers real authority lay with leadership, the founding religious community, and fee-paying parents; teachers were expected to follow directives. The ideal of "education as a covenant" – a trust-based partnership among teachers, students, and parents (Granados & Granados, 2009) – felt one-sided, bonding students, parents, and leadership while excluding teachers. Compassion for struggling staff was scarce; paradoxically, a school grounded in community marginalised its educators. By the end of the year, none of the native English-speaking teachers who started with me remained, reflecting the gap between vision and practice.

Despite these challenges, I chose to remain at Seafarers, but my reasons evolved. I initially joined because of the school's romantic ideals and values, which resonated with my own spiritual and professional philosophy (Maltman et al., 2021). Over time, I came to see my tenure as an opportunity to investigate and perhaps influence the school's approach to bilingual education and giftedness. Seafarers College had invested heavily in state-of-the-art science and technology labs – resources with great potential for innovative STEM learning – but I observed these labs were used only superficially, mostly showcased on social media rather than integrated into a richer pedagogy. I wanted to understand how Seafarers' leadership conceptualised bilingual STEM education and gifted education: Was there a coherent vision? Why were there such discrepancies between the rhetoric of critical thinking, individualised education, and virtue development and the reality of teaching to the test and one-size-fits-all instruction? I also felt driven to give voice to the experiences of my fellow teachers – both those who remained and those who were dismissed for asserting professional agency. My journey thus far had underscored the importance of teacher autonomy and agency in enacting meaningful education (Ball, 2016). I came to believe, as Arthur Chapman (2013) advised, in tracing the "golden thread" of my own educational values – in my case, a steadfast belief in teacher agency and the need to adapt education to students' needs rather than bureaucratic mandates. By engaging in reflective practice and research, I sought to reclaim some of my professional agency and to help others do the same. Only by being an insider in this case study, I reasoned, could I truly grasp the nuances of the situation and work toward change.

1.5. Summary

Key points to take forward are these: first, persistent ambiguity about what *counts* as STEM across policy, school, and classroom levels makes coherence of aims and pedagogy difficult; second, identification and support for gifted learners are inconsistent and often reactive, producing uneven provision and missed potential; and third, in this bilingual setting, an aspirational philosophy sits uneasily alongside exam-driven practices that "teach to the middle," limiting differentiation for high-ability students. Taken together, these tensions define the problem space for the case study and justify a collaborative, context-responsive model of support for gifted students in STEM. The next section sets out how the study will interrogate these issues through its guiding questions and approach.

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2. Study Purpose and Objectives

Considering the issues described above, my study sets out a critical examination of how gifted students in STEM are supported or not within the Seafarers bilingual secondary school context. The overarching purpose is to investigate and co-construct, with stakeholders, a model of support for gifted students in STEM at Seafarers that could potentially inform practice in similar settings. More specifically, the general objective of the study is to critically examine how gifted students are conceptualised, identified, and provided for, within the broader framework of STEM education and gifted education in Spain. Four interrelated specific objectives guide my study:

i) To investigate how STEM subject teachers and gifted students at Seafarers College conceptualise the meaning and purpose of STEM education within a bilingual learning environment,

ii) To explore the meanings and significance that both teachers and students assign to the concept of giftedness,

iii) To examine the whole-school strategies and policies in place at Seafarers College for identifying gifted students and for supporting their educational needs,

iv) To analyse the specific teaching strategies and in-class provisions employed by STEM teachers at Seafarers to meet the needs of gifted learners in the classroom.

Each theme is associated with focused research questions, detailed below.

- Under the first theme of STEM Education, I am interested in finding out how Seafarers teachers conceptualise STEM education and how gifted students perceive and experience STEM in bilingual setting.
- Under the second theme of Gifted Provision, I ask what processes are used at Seafarers to identify gifted students; what whole-school strategies and approaches are implemented to support them; what teaching practices STEM teachers employ to meet gifted learners' needs in the classroom; and how gifted students evaluate the adequacy and effectiveness of the support they receive at both classroom and institutional levels.

While each of the above questions targets a specific facet of the phenomenon, my study also seeks to synthesise insights across them to answer an overarching research question: *How can a school-specific model of support for gifted students in STEM be co-constructed at Seafarers, and what elements of this model might be applicable to other educational contexts?*

The overarching question is forward-looking and design-oriented in that it implies that my research is not only diagnostic but also generative. In essence, by understanding the current situation I hope to collaboratively create a more effective approach to gifted STEM education that is sensitive to the bilingual context and can perhaps inspire similar schools.

3. Literature Review

3.1. STEM Education: Concepts and Challenges in Context

"STEM education" is now ubiquitous in policy and practice, yet its meaning varies widely. Initially promoted for economic and workforce goals, STEM functions as a "boundary object" that different stakeholders reshape (Breiner et al., 2012). In some settings it names four discrete subjects; in others, it signifies an integrated, problem-centred approach (McComas & Burgin, 2020; Williams, 2011). These competing views map onto divergent aims, producing more technical graduates versus cultivating broad STEM literacy for democratic engagement (McComas & Burgin, 2020; Williams, 2011). Expansions such as STEAM and STREAM seek to foreground creativity and communication (Anderson et al., 2021) yet simply adding letters does not resolve tensions over what "counts" as Science, Technology, or Engineering—debates that often mirror curriculum power struggles (Dillon & Herman, 2023). A recent historical analysis argues that the acronym's "semantic slipperiness" lets STEM be all things to all people; the authors urge actors to declare their definition and goals, balance disciplines, negotiate shared rationales, and embed equity from the outset – or collaborations will flounder (Millar, Park & Dillon, 2025). Some even propose retiring the acronym in favour of more

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precise labels, though a pragmatic stance is to keep STEM while insisting on transparency and shared purpose (Millar, Park & Dillon, 2025).

In Europe, the Scientix review notes that Spain has prioritised STEM – and the new education law LOMLOE (Ramil & Ucha, 2020) names STEM competences as one of eight key learning areas, linking STEM to gender-equity aims (Estévez & Baelo, 2021). Yet policy leaves "what counts as STEM" vague, there is no national integrated STEM curriculum, and "STEM" and "STEAM" are used interchangeably across regions. Autonomous communities pursue disparate initiatives (Estévez & Baelo, 2021). In practice, teachers often receive mixed messages and limited support. Schools are urged to "do STEM," which can be reduced to technology use, coding, or robotics rather than a coherent interdisciplinary pedagogy (Estévez & Baelo, 2021). The ambiguity frames the backdrop for the case-study school, where leaders champion STEM rhetorically and invest in facilities, but a shared, robust conception of integrated STEM remains uncertain (Estévez & Baelo, 2021).

3.2. STEM Education in a Bilingual Classroom – Local Observations

Within Seafarers College, my own classroom observations prior to this study provided insight into how STEM subjects were being taught in the bilingual setting. Across various science and math lessons taught in English, I noted a common pattern, instruction was largely didactic and teacher-centred, with low student engagement. Students often appeared bored and passive; when they did participate or ask questions, it sometimes disrupted the teacher's scripted lecture flow. For example, in one Year 3 Chemistry class of Educación Secundaria Obligatoria (ESO), the teacher expected students to have memorised the word and symbol equations of the group one and group two elements of the periodic table at home, and the class activity consisted of quizzing each student in turn on symbols and electron configurations. Many students were restless or anxious, noise levels rose, and the teacher struggled to maintain discipline. The teacher resorted to threats of punishment which were seldom enforced, undermining credibility. Interestingly, whenever a serious disciplinary moment arose, the teacher switched to Spanish to scold students – a tacit acknowledgment that when it came to important communication, reverting to the native language was more effective. After such detours, students themselves would remind the teacher to continue in English, highlighting the somewhat performative nature of using English in class.

In all the lessons I observed prior to the study, there was a strong emphasis on memorisation and procedural recall, and virtually no hands-on experimentation, inquiry-based learning, or conceptual discussion in English. Students had high enough English proficiency that they sometimes corrected the teacher's English phrasing or pronunciation, which indicates that language per se was not the sole barrier. In post-lesson reflections, some teachers confided that teaching in English made them feel they had to "simplify" content and avoid open-ended discussions or projects, because they feared losing control or failing to explain adequately in a second language.

Teachers also felt tremendous pressure, if students did poorly or parents complained, the teachers risked being blamed and even losing their jobs, which happened to two STEM teachers within a few months. Notably, those teachers were excellent when teaching in Spanish, but once forced to teach their subject in English, student complaints about boring or confusing lessons piled up. One teacher remarked that student behaviour was "perfect" in Spanish-speaking classes but not in English-speaking ones. A student explained that in Spanish class "we know what's expected – listen and take notes," implying that the English-medium classes lacked clear expectations and routines. After I reported these observations and concerns to the school leadership, a significant change occurred, in early 2023, the school reverted several STEM subjects from English back to Spanish as the medium of instruction mid-year. Immediately, the behaviour problems and disengagement largely disappeared.

These events underscore a key insight that bilingual teaching is not just teaching in another language; it requires a fundamentally different pedagogical approach. Expecting subject teachers untrained in bilingual methods to simply "teach as usual but in English" is a recipe for superficial learning and teacher demoralisation (Hidalgo-McCabe & Tompkins, 2024). In my own Technology

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classes, I found that adopting active learning approaches – such as hands-on projects, collaborative problem-solving, and allowing some translanguaging – led to far better engagement and understanding than the rote, note-taking model prevalent in other classes.

The takeaway is that any effective model of gifted STEM education at Seafarers College will likely need to incorporate such active, student-centred pedagogies. A bilingual STEM program that fails to adapt pedagogically not only risks losing gifted students' interest but can even turn students against the very idea of bilingualism if they associate English-taught classes with confusion and boredom (Hidalgo-McCabe & Tompkins, 2024).

3.3. Conceptions of Giftedness — From Fixed Trait to Developmental Potential

Early psychometric views treated giftedness as a stable trait — often defined as IQ ≥ 130 — assessed once and for all. Contemporary scholarship reframes it as multidimensional, developmental, and context-sensitive, distinguishing potential from performance (Olszewski-Kubilius, & Worrell, 2011; Pfeiffer, 2012; Subotnik,). Renzulli's Three-Ring Model positions giftedness as a set of malleable behaviours rather than a permanent status (Renzulli, 2012), while Gagné's Differentiated Model of Giftedness and Talent (DMGT) separates "gifts", natural abilities, from "talents", developed skills, emphasising intrapersonal and environmental catalysts such as motivation, instruction, and mentorship (Gagné, 2011, 2015). This shift rejects gatekeeping – asking "Is the child gifted?" – in favour of "In what ways, to what extent, and under what conditions might the learner excel?" (Treffinger & Feldhusen, 1996). It also motivates multifaceted identification (Richert, Alvino, & McDonnel, 1982) and methods that look beyond single scores. Out-of-level testing, for instance, has uncovered substantial hidden gifts – about 20% of participants perform at or above the level of college-bound seniors (Stanley, 2005). Standardised achievement data can flag domain-specific strengths that IQ tests may miss, but they risk rewarding test-wiseness over creativity and can depress scores for anxious or format-unfamiliar students. Moreover, identification alone fails to prevent the widespread underachievement observed among identified gifted students (Reis & McCoach, 2000).

In practice, some modern systems, such as Turkeys BILSEM national model, use staged multiple-criteria processes – universal screening, nominations, deeper psychometric or portfolio reviews, and professional judgment – to widen access and reduce bias rather than enforcing a fixed label (Baldwin, 2005; Chan, 2002; Johnsen, 2012; Orakcı, 2025; Plucker et al., 2004; Siegle et al., 2014; VanTassel-Baska & MacFarlane, 2008). Still, comprehensive identification is resource-intensive and demands trained staff, fair instruments, including assessments in students' dominant languages, and consistency across evaluators.

3.4. Provision for Gifted Students — School Strategies

Identification is only the start; provision determines whether potential is realised. Spain generally integrates gifted learners into mainstream settings, expecting curricular adaptations and enrichment rather than separate schools (e.g., Spanish Royal Decree 943/2003 in Touron et al., 2005). In practice, however, provision is sparse, resources tend to gravitate toward students with visible difficulties, while high-ability learners – often meeting minimum benchmarks – receive "more of the same," (Máximo et al., 2017). Where some regions offer limited pull-out or weekend programs, day-to-day differentiation in regular classrooms remains inconsistent. The consequence echoes the research, without sustained challenge, gifted students may disengage and underachieve, including in STEM domains that especially require depth, problem-solving, and opportunities for creativity (Reis & McCoach, 2000; VanTassel-Baska & MacFarlane, 2008).

Appropriate challenge and systematic differentiation are central to engagement (Tomlinson et al., 2003). In STEM, effective options include curriculum compacting, independent or small-group research projects, mentorships and competitions, advanced coursework or subject-specific acceleration, and inquiry-based learning. Enrichment should be embedded in the regular science curriculum — "bonus" work outside class can feel punitive — while routine use of open-ended

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investigations and higher-order questioning better sustains motivation (Watters & Diezmann, 2003). School year acceleration can solve pacing issues, but without concurrent enrichment it may neglect the creative and analytical growth gifted learners need; depth and complexity should take precedence over mere speed (Renzulli, 2012; Hockett, 2009).

A consensus in gifted curriculum design prioritises big disciplinary ideas, advanced or abstract content, authentic disciplinary methods, real-world problem-solving, and student autonomy (Hockett, 2009). Well-designed STEM pedagogy naturally aligns with these principles. For example, project-based engineering challenges promote creative problem-solving and allow gifted learners to extend beyond the standard curriculum (VanTassel-Baska & Baska, 2021), and programs that let students act as scientists or engineers – posing questions, designing experiments, and iterating solutions – provide the depth they crave (Yoon & Mann, 2017).

Underachievement – the gap between measured potential and actual performance – has academic, motivational, social-emotional, and environmental roots; it can be domain-specific and is shaped by cultural dynamics and stereotype threat (Ford, 2013). In Spain, research on gifted underachievement is limited, but "coasting" is commonly observed, without identification, teachers may misattribute a gifted student's inconsistent performance, and once labelled, students may face unrealistic expectations to excel in every subject (Ford, 2003, 2013). Implementation quality matters poorly executed "STEM enrichment" can depress performance and interest (Steenbergen-Hu et al., 2020), whereas well-designed STEM interventions reliably boost achievement and engagement (Sahin & Yıldırım, 2020). Identification, therefore, must be paired with active cultivation.

In the next section, Conceptual Framework, I will discuss the theoretical lenses through which these issues will be examined, including critical perspectives and transformative pedagogical approaches. These frameworks will guide the research in interpreting findings and co-designing solutions. Following that, the Methodology section will detail how the study was conducted as a participatory case study within Seafarers College, outlining the data collection and analysis methods used to investigate the research questions.

4. Conceptual Framework

To analyse the complex interplay of STEM education, giftedness, and the bilingual context at Seafarers College, a multi-faceted conceptual framework guides the study drawing on theories of educational equity and critical pedagogy, as well as insights from gifted education research and the school's own philosophical underpinnings, to create a lens through which to interpret findings and inform action. The synergy between STEM pedagogy and gifted pedagogy; the influence of language and identity on gifted education in a bilingual setting; the examination of gifted identification and support through Critical Race Theory (CRT); and the vision of education as liberation and humanisation combined with the school's virtue-centred ethos, shape my s and these strands together help me ask not only what is happening at Seafarers, but *why*, *for tudywhom*, and *how* it might be transformed.

4.1. STEM and Gifted Education: A Synergistic Pedagogy

One premise of my study is that effective STEM education and effective gifted education share many core principles, thus, improving STEM instruction can naturally complement gifted pedagogy. STEM pedagogy, when implemented in its intended integrative spirit, emphasises inquiry, problem-solving, creativity, and higher-order thinking – all of which are also recommended for engaging gifted learners (VanTassel-Baska & Baska, 2021; Yoon & Mann, 2017). Hockett (2009) identified five key principles for curriculum and instruction for academically gifted students: (a) a conceptual approach focusing on the big ideas of a discipline rather than isolated facts, (b) pursuit of advanced content for deeper understanding, (c) use of methods and materials similar to those of practicing professionals in the field, (d) emphasis on tackling real-world problems that have transformative potential, and (e) a flexible learning environment allowing for student choice and self-direction. Notably, contemporary reformers in STEM education advocate very similar approaches for all

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students, project-based learning anchored in real-world challenges, integration of knowledge and practice (learning science by doing science), and student-centred learning paths (National Research Council, 2012; Bruce-Davis et al., 2014). In the context of this study, the synergy suggests that addressing the needs of gifted students in STEM does not require an entirely separate pedagogical model – rather, it calls for a full-fledged STEM approach.

At Seafarers, I have seen prior to the study that STEM subjects were largely taught through rote lectures, which failed to engage even the general student body, let alone challenge gifted learners. The conceptual framework posits that shifting to an inquiry-oriented, student-centred STEM pedagogy will inherently benefit gifted students. Research by VanTassel-Baska & Baska (2021) found that when students conducted student-led investigations in science within a rich contextual environment, learners showed improvements in engagement and understanding. Such an approach aligns with Renzulli's (1977) Enrichment Triad Model, which encourages exposing students to various topics, training them in thinking and research skills, and then guiding them to conduct self-selected projects at advanced levels. Gifted education has long championed the idea of turning students into young scholars or creators; similarly, STEM education encourages even very young students to adopt the habits of mind of STEM professionals. Both perspectives converge on the importance of teachers acting as facilitators and mentors rather than mere information deliverers (Nadelson & Seifert, 2013). Indeed, a recurring theme in the literature is the critical role of the teacher as a catalyst for talent development. Gagné (2015) explicitly notes that teachers are among the most influential environmental catalysts in converting a student's potential into achievement. If teachers adopt challenging, open-ended pedagogies in STEM, they can spark gifted students to reach new levels and, similarly, motivate other students. But if teachers stick to narrowly defined tasks and low-level goals, they may effectively suppress the expression of giftedness. Here therefore I view teacher perceptions and attitudes as central. Understanding how Seafarers College's STEM teachers conceptualise STEM education and their own role, Research Question 1, will shed light on whether they see themselves as such catalysts and whether they feel empowered to teach in more dynamic ways.

One concept particularly relevant here is teacher agency. Drawing from Archer (2007) and Bandura (1987), teacher agency refers to the capacity of teachers to intentionally make choices and act in line with their professional values and their students' needs, rather than simply complying with external mandates. If Seafarers' teachers feel bound to "teach to the test" or to a rigid one-size-fits-all script, then even if they agree that STEM should be hands-on and differentiated, they may not enact it. Conversely, empowering teacher agency through supportive leadership, professional development, and a culture of innovation could enable the pedagogical shifts needed for both effective STEM and effective gifted education, resonating with the literature on educational change, which shows that sustainable reform occurs when teachers are co-creators of new practices, not just implementers of others' directives (Fullan, 2016). Therefore, the conceptual framework considers teacher agency and self-efficacy (Bandura, 1987) as a critical lens, how do teachers' beliefs in their capacity to teach STEM in innovative ways, and their autonomy to do so, affect the provision for gifted students? Frances Hunt (Bourn et al., 2016) argues that agency without self-efficacy is hollow – teachers must see the need for change and believe in their ability to effect it (Winebrenner & Devlin, 2001).

4.2. Language, Identity, and Giftedness in a Bilingual Setting

Another vital lens in this study is the recognition that language and cultural identity profoundly influence the experience of gifted education, especially in bilingual environments. Although earlier sections touched on bilingual program issues broadly, the conceptual framework here delves deeper. It considers how being in a bilingual classroom might mask or distort demonstrations of giftedness, and conversely how gifted education practices might need adaptation for bilingual learners. Golden's (2024) work on language ideologies provides a caution that is directly relevant in that an "English-only" policy in class can send the message that a bilingual gifted student's home language, and by

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extension cultural identity, is devalued, which may lead to disengagement or reluctance to participate. Such assimilationist policies effectively privilege those already proficient in the dominant language, creating an institutional bias.

The framework thus adopts a stance of culturally and linguistically responsive gifted education. The notion of translanguaging (García & Wei, 2015), as advocated by Golden (2024), is particularly powerful, it sees bilingual individuals not as two monolinguals in one body, but as having one integrated linguistic repertoire. In a translanguaging classroom, students might discuss a complex problem in their native language to ensure deep understanding, then present it in the second language, leveraging their full cognitive capacity (Golden, 2024). We would not want limited second-language vocabulary to constrain a gifted student's conceptual contributions.

At Seafarers, the tensions already observed all point to the need for a more deliberate bilingual pedagogy. The conceptual framework proposes that effective gifted education in a bilingual school requires attention to language development and identity affirmation as part of the strategy. Delavan et al. (2021) remind us that bilingual education was meant to be empowering; thus, a bilingual gifted support model should aim to empower gifted bilingual students by valuing their bilingualism as an asset. Additionally, identity safety is crucial, students should not feel they have to hide parts of their identity, be it language, culture, or even the identity of being "smart," which some adolescents mask to fit in (Steele, 1997).

I emphasise, therefore, an intersectional approach (Crenshaw, 1989), the idea that multiple aspects of identity intersect to affect educational outcomes therefore I will look at how being a gifted student intersects with being, for instance, a Spanish English bilingual, or a student from a non-Spanish cultural background at a Catholic school. The aim is to ensure that any model we co-construct is equitable and inclusive, addressing not just the generic "gifted student," but the gifted student as a whole person with a particular identity and cultural context.

4.3. Giftedness Through Critical Race and Gender Lenses

Building on the above, the framework incorporates Critical Race Theory (CRT) to interrogate how power, privilege, and bias may influence gifted education at Seafarers and beyond. CRT in education (Ladson-Billings & Tate, 1995) starts from the premise that racism is not just individual bias but a systemic feature of institutions, often manifesting in subtle ways that advantage the dominant group. Applying CRT to gifted education, I ask, whose knowledge and cultural norms define giftedness at Seafarers? Who is being left out or overlooked? As noted, in many contexts gifted programs are disproportionately white and affluent. In our context, Seafarers College is a private school with a largely middle- to upper-class Spanish student body. A CRT lens prompts examination of whether, for example, the characteristics that teachers associate with giftedness align more with behaviours common to students who have a lot of cultural capital – those who have been to museums, travelled abroad, read certain books – while misinterpreting or overlooking the abilities of students from less privileged or different backgrounds. For instance, a teacher might equate giftedness with neat work and class participation, while missing unconventional indicators of high potential, such as creative or curious behaviours that appear off-task. Implicit biases could lead to certain students being referred while others are overlooked. In line with CRT's emphasis on marginalised voices, I aim to include interviews with gifted students, so their perspectives are valued – reflecting the participatory view that those experiencing an issue have important knowledge to contribute. These insights serve as counter-stories (Solórzano & Yosso, 2002) that can challenge the mainstream narrative.

4.4. Giftedness and STEM as Instruments of Liberation and Humanisation

Guided by Freire's critical pedagogy which treats education as a practice of freedom in which teachers and students co-create knowledge to overcome oppression (Freire, 1998), both gifted and STEM education can either entrench, privilege or empower the marginalised. Reframed through humanisation, identifying and nurturing the gifts of disenfranchised learners becomes an act of

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liberation that resists deficit thinking; success is measured not only by serving those already identified but by discovering and uplifting those previously overlooked (Freire, 1970).

STEM, likewise, must answer Freire's question, STEM for what? If taught as mere workforce training, it is not emancipatory; taught critically – through inquiry, local problem-solving, and ethical reflection – it can build agency and community impact (Freire, 1998). Transformative pedagogy invites "disorienting dilemmas" that surface values and assumptions (Mezirow, 2000). Because dialogue is central to emancipation, I aim to adopt participatory action research so teachers and students act as co-investigators, helping frame problems and solutions (Cammarota & Fine, 2008).

The next section details the methodology shaped by these commitments, a case-study design employing PAR within pragmatic/constructivist paradigms, specifying data sources, participants, and a thematic analysis aligned with the concepts above (Cammarota & Fine, 2008; Freire, 1998; Mezirow, 2000).

5. Methodology

5.1. Research Design and Paradigm

The study adopts a qualitative case study design with an embedded action research orientation, focusing on how Seafarers College supports gifted students in STEM. A case study approach was chosen to enable in-depth, contextual understanding of the complex educational phenomenon within its real institutional setting. In line with case study best practices, multiple data sources, interviews, lesson observations, documents and online questionnaire were collected for triangulation.

Underlying the design is a constructivist–interpretivist paradigm (Denzin & Lincoln, 2011; Guba & Lincoln, 1989) blended with elements of pragmatism, where reality is viewed as socially constructed: teachers, students, and school leaders each have their own interpretations of giftedness and STEM education that shape their actions. Rather than seeking a single objective truth, the study captures multiple perspectives and negotiates meaning collaboratively. I as the researcher am also part of the social reality at Seafarers as an insider, so knowledge was co-constructed with participants through dialogue and interaction. At the same time, a pragmatic stance is taken, the research is outcome-oriented, aiming for practical improvements in the school. Pragmatism emphasises "what works" to address the problem and permits using any methods that prove useful (Creswell & Plano Clark, 2011; Morgan, 2014). While qualitative methods dominate, some simple quantitative measures were included to inform my understanding mainly from the Likert style questions in the online questionnaires. Solving the practical problem of supporting gifted STEM students was prioritised over strict adherence to a single method. I also acknowledged that my own values and insider position would influence the inquiry.

5.2. Action Research Orientation

A key methodological feature is the incorporation of action research, specifically a participatory action research (PAR) approach. Action research involves practitioners investigating their own context to spur change. In this case, I was simultaneously a teacher at the school and the researcher, acting as a change agent. The project proceeded in three iterative phases: assessing the school's conceptions of STEM (Phase 1), evaluating its provision for gifted students (Phase 2), and collaboratively developing and implementing a support model (Phase 3). After each phase of data collection and preliminary analysis, I facilitated a group reflection with participants often informal discussions, then we planned an action based on the findings and aimed observe its effects in the next phase.

Consistent with PAR principles, I treated participants as co-researchers rather than research subjects. Teachers – and even some students – took part in analysing data and validating interpretations during the process. For example, after interviews then in focus group of teachers or students, often over lunch, we discussed emerging themes and affirmed or challenged my

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interpretations. Involving participants in this way was intended to empower them to bring about changes, since people are more likely to embrace improvements, they have helped to shape.

The action research orientation also carried ethical considerations, especially given my insider role. I was transparent about the project's intent and invited colleagues to be co-inquirers, which helped mitigate potential power imbalances, in appendix 10.1 you will find a detailed ethics form as well as the risk assessment for the study both meeting the requirements of the BERA Guidelines (Farrimond, 2017). Colleagues did not feel I was evaluating their teaching; instead, we worked together on identifying issues and solutions, in appendix 10.2 you will be able to read the invitation emails along with the information leaflets that were emailed to parents and teachers along with students. By working closely with participants, I aimed to ensure any actions were well-grounded in the school's unique context and supported by those involved.

5.3. Epistemology, Ontology and Researcher Positionality

Ontologically, my research assumes a relativist stance, reality is not a fixed entity but is constructed through the perceptions and interactions of people. In the context of the study, the "reality" of gifted education at Seafarers may look different from a student's perspective than from a teacher's or an administrator, and all these viewpoints are considered valid. In practical terms no single data source or stakeholder perspective was treated as inherently more correct than others; each provided a piece of the overall picture. Epistemologically, the research is grounded in social constructivism, the idea that knowledge emerges from social interaction and shared understanding. Rather than testing formal hypotheses, I relied on interactive, dialogue-based methods to generate insights into the situation and to formulate solutions.

My positionality as an insider, a teacher at the research site, offered significant advantages but also demanded careful reflexivity. As a member of school staff, I had built trust and easy access to participants, and I understood the school's norms and culture intimately. However, being an insider also carried the risk of bias and could influence how openly others shared their views. I was aware that some colleagues might be hesitant to voice criticisms of the school in front of me, and that my own enthusiasm for gifted education could colour my interpretations if unchecked. To manage these concerns, I engaged in ongoing personal self-reflection. I drew on Thomson and Gunter's (2011) notion of "fluid positioning" to examine how my dual role as teacher–researcher might affect the data and the research process. In practice, I acknowledged my predispositions to participants and actively sought out divergent viewpoints. For example, since I was known to advocate for gifted education, I specifically encouraged colleagues sceptical of the gifted label to speak up and challenge ideas during discussions preventing an echo chamber of like-minded opinions and allowed me to hear critical perspectives that might otherwise have been muted.

Formal ethical clearance for the study was obtained through the university's ethics review and the school administration, please see appendix 10.1. Informed consent was obtained from all participants before they took part. Participants were assured that participation was voluntary and that critical feedback would have no repercussions on professional relationships. All data were kept confidential with participants anonymised in transcripts and reports and given pseudonyms to refer to them, please see appendix 10.2. These measures helped ensure that colleagues and students felt safe to express themselves despite my role as an insider.

5.4. Data Collection Methods

Data collection occurred in three phases corresponding to the study's focus areas, the primary methods were semi-structured interviews, direct observations, and collaborative focus group discussions along with online questionnaires, each contributing a different perspective on the case.

I conducted semi-structured interviews with a cross-section of stakeholders, including teachers, students, parents, and administrators. In total, five secondary STEM teachers were interviewed and all 14 secondary students who the school had on record as gifted participated. One parent of each gifted student also took part, with five of these parents volunteering for in-depth interviews. The

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interviews followed open-ended guides tailored to each group. Teachers were asked about how they implement STEM education in practice, how they identify and support high-ability learners in their classes, and what challenges they face in doing so. Students were asked whether they felt sufficiently challenged or ever bored in class, what kinds of activities most engaged them, and their suggestions for making science and math lessons more interesting. Parents were asked how their child was identified as gifted, what support (if any) they observed the school providing, and any recommendations they had for improvement. Administrators were asked about policy-level issues – for instance, how the school defines and identifies gifted students, what strategies if any, were in place for these learners.

I carried out four non-participant classroom observations in STEM subjects across different grade levels. During each observation, I took detailed field notes on teaching methods, student engagement, and any differentiated instruction for advanced students that I could observe. Particular attention was given to how the identified gifted students in those classes behaved and were catered to – for example, whether they mastered the material quickly and, if so, how the teacher responded. I used an observation protocol adapted from Ramirez-Verdugo (2023), please see appendix 10.3, to guide these observations, adding STEM-specific criteria to the checklist to focus on relevant instructional practices. These structured notes were supplemented with narrative observations to capture contextual details and interactions not covered by the checklist.

After each phase of initial data analysis, I held a feedback and planning session with participants as part of the action research cycle. In these focus group meetings, often over lunch, I presented the preliminary findings from that phase and we collaboratively discussed their implications and brainstormed actions. For instance, at the end of Phase 1, I met with a group of STEM teachers to review how "STEM" was being variously defined and to plan steps toward a more consistent approach. Each of these reflection meetings served as a form of member check—participants validated or refined my interpretations—and as a planning workshop to generate practical improvement ideas for the next cycle.

A google questionnaire was emailed to the parents and the students in the school who based on the data provided by the school have been identified as gifted. A google questionnaire was also emailed to the STEM teachers in the school. These were emailed prior to the interviews and group discussions. The questionnaire collected quantitative data in the form of Likert scale responses and qualitative data where parents and children are asked to give an explanation with examples on their answers. Please see appendix 10.7 and 10.8 for the responses to the online questionnaire.

5.5. Participants and Sampling

Using purposive sampling (Merriam & Tisdell, 2016) to select information-rich cases – an approach typical in qualitative case studies – the study engaged several key groups of participants. Five secondary STEM teachers, including the STEM program coordinator, took part in interviews, representing a range of STEM subject areas, in the study they are referred to using pseudonyms. All 14 students in the secondary section who had been identified as gifted participated in the research, via interviews or focus groups, they have also been given pseudonyms. One parent of each of these students also contributed, with five of these parents taking part in one-on-one interviews to provide a detailed parent perspective. Finally, several key school leaders, notably the principal, the deputy director of secondary, and the school psychologist, were included to offer an administrative and policy viewpoint.

5.6. Data Analysis

Data were analysed using an iterative thematic analysis approach (Braun & Clarke, 2006). All interview and focus group recordings were transcribed using Turboscribe and observation notes were expanded into detailed narratives. I reviewed the transcripts and notes thoroughly and coded the data inductively, allowing patterns to emerge without imposing predefined categories, please see the end of appendix 10.4, 10.5 and 10.6. After coding, related codes were collated into broader themes,

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please see appendix 10.9, 10.10 and 10.11 for teacher analysis, student analysis and parent analysis. The key themes included insufficient differentiation for high-ability learners, inconsistent understandings of STEM among staff, gaps in the gifted identification process, tensions between the bilingual program and support for gifted students, and various equity issues, and from these I tried to create links between the themes and reach possible conclusion, please see appendix 10.12 and 10.13 for analysis processing and analysis summary. Each theme was supported by multiple data sources. To enhance trustworthiness, I employed several strategies (Guba & Lincoln, 1989), triangulation of sources, participant member checks, and an audit trail of the research process.

6. Data Analysis: Gifted Education in STEM at Seafarers

6.1. Regional Guidelines and Recommended Practices for Gifted Education

Educational policy in Spain, the 2020 LOMLOE law (Ramil & Ucha, 2020) and specifically the Community of Madrid's guidelines frame gifted education as part of "atención a la diversidad", attention to diversity, within inclusive schooling. At the secondary level, public schools are encouraged, and to some extent required, to implement specific measures for gifted students, but private schools like Seafarers are only obliged to identify and report the number of gifted students – any further provision is advisory rather than mandated. Seafarers' own inclusion policy acknowledges the regional legislation, the 2015 regional order and subsequent guidelines, and expresses intent to follow it, but without legal enforcement these remain recommendations, meaning that while a framework for gifted education exists, its implementation at Seafarers is left to the school's discretion.

Regional guidelines and best practices emphasise a proactive and enriching approach to gifted education. Key recommendations include, a) early Identification where teachers and families are urged to notice indicios, signs of high ability– such as unusually advanced performance, fast learning pace, curiosity, or creative thinking; b) ordinary classroom enrichment were the regional guide calls for "ordinary measures" – enrichment and extension activities embedded in regular classrooms for high-ability students. Teachers are expected to differentiate instruction, providing broader or deeper content, "open-ended tasks", and opportunities for creative inquiry within the standard curriculum; c) extraordinary measures when needed which might include individualised adaptation plans, subject acceleration (skipping ahead in a specific subject), or year skipping. Any such measure should be based on careful assessment and in consultation with families; d) individualised plans and documentation should detail how each subject teacher will extend or adapt the curriculum for the student. The goal is to ensure the "gifted" label comes with a clear strategy to meet that student's needs, rather than treating identification as an end in itself; e) teacher training and collaboration on differentiating for gifted learners and to facilitate regular meetings between the Special Educational Needs (SEN) team and teachers. Through collaboration, teachers can share best practices and coordinate strategies so that the student's needs are consistently addressed across classes; e) holistic, student-centred pedagogy, where teachers are encouraged to use inquiry-based and project-based learning, interdisciplinary projects, and real-world problem solving in STEM to engage gifted students.

In summary, the ideal scenario outlined by policy is that a school like Seafarers would actively seek out gifted students early, then deliberately nurture their talents within the regular classroom through enriched pedagogy, with monitoring and collaboration in place. However, because Seafarers is a private institution and these guidelines are advisory, a critical question is how closely the school's actual practices mirror these recommendations.

6.2. Gifted Education Practices at Seafarers

The day-to-day practices at Seafarers diverge markedly from the enriched, student-tailored approach envisioned by regional guidelines with lesson observations revealing "traditional teaching methodology… textbook dependence… no investigations." Below, we outline the actual practices

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observed in STEM classrooms and school-wide, including how STEM is taught, how identified gifted learners are, or are not, accommodated, and gifted students' own experiences.

6.2.1. STEM Teaching and Classroom Experience

STEM classes at Seafarers are taught in a traditional, teacher-centred manner, with each subject, science, technology, engineering, maths taught in isolation. Teachers largely adhere to conventional lecture-style instruction focused on covering the curriculum and preparing for exams. In classroom observations, teachers typically stood at the front delivering content while students sat in rows taking notes, in a physics lesson observation, I noted that the "teacher did not stop talking during the whole lesson". Interactive, hands-on, or inquiry-based activities were minimal to non-existent. For example, in the same physics lesson the teacher Elena, please be aware that all names are pseudonyms, emphasised rote learning by writing terms and definitions on the board "to be memorised," then had the class recite formulas. Similarly, no interdisciplinary projects or collaborative problem-solving tasks were observed; each STEM subject was treated as a separate silo, and even in science classes there were no lab experiments or practical investigations taking place. The lessons observed had "no title nor objectives" and progressed with "theory with closed questions." While Marta, the maths coordinator, described an ideal of STEM as interconnected, "so that students can solve and learn in a holistic way, with mathematics as the backbone," and another, Steven, biology teacher, spoke of teaching students to think independently across disciplines, these progressive visions were not evident in their actual teaching practice. In fact, there appears to be no shared, consistent vision of STEM education among the staff – tellingly, the secondary school coordinator admitted, "I have no idea about the STEM group," suggesting STEM is regarded by some as just another subject or occasional club "done in the STEM lab" rather than a whole-school pedagogical approach. In summary, Seafarers' prevailing STEM pedagogy is conventional: subject-specific, theory-heavy, and teacher-led, with little integration or active learning – a context that provides limited stimulation for gifted learners who thrive on complexity and creativity.

Within the traditional classroom setting, gifted students receive the same instruction and tasks as all other students, with no differentiation in content, pace, or depth. Lesson observations and teacher interviews confirmed that Seafarers' STEM teachers generally adopt a "one-size-fits-all" approach. As Alma the maths teacher confirmed, "There is no differentiation of the work. All students do the same thing", regardless of ability, are taught using the same lectures, complete the same textbook exercises and homework, and take the same assessments, all at the same pace. For instance, in one observed science class taught by Andrés, science coordinator, every student was assigned the exact same project as homework. The two identified gifted students in that class produced videos that were no more in-depth than their peers', and during the class screening of these videos, the teacher did not ask any additional probing questions or offer any extension to push the gifted students further. When reviewing solutions to maths problems or physics questions, teachers directed the answers to the whole class uniformly, there were no optional advanced problems given and no adjustment of questioning to challenge the quicker learners, "no… they all had to listen and make notes." Even when a gifted student finished an assignment early, they were expected to sit quietly and wait for others to catch up, rather than being provided an alternative task or enrichment activity. Andres explained in the post lesson observation feedback session "For gifted students—extra exercises to do at home, extra points in the exam." In effect, gifted students in STEM classes at Seafarers experience a curriculum aimed at the middle, with no systematic opportunities for deeper exploration or accelerated learning in the classroom.

In interviews and surveys, gifted boys overwhelmingly reported that their STEM classes are "unstimulating" or "too easy." Jon one of the students when asked to reflect on his last lesson comments that "It was a little bit boring." They often feel bored and invisible, they are physically present but mentally unengaged because the material is something they have already mastered or can grasp with minimal effort. For example, in one observed maths lesson a gifted student, Santi, sat quietly and wrote almost nothing for the entire hour. When asked later why he hadn't participated,

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he shrugged that "I knew it all – last year we did the same thing." With no new challenge presented, Santi simply checked out of the lesson. In another case, Felix was spotted doing homework for a different subject, English, during maths class; he explained afterward that the maths exercises were "easy and uninteresting" for him that he preferred to use the time for something more productive. These anecdotes illustrate a common pattern, when work is repetitive or below their ability level, gifted students at Seafarers tend to disengage, sometimes opting to occupy themselves with unrelated tasks or simply daydreaming. They rarely cause disruptions – indeed, teachers noted these high-ability boys are often well-behaved and "fly under the radar", but that very passivity means their lack of challenge can go unnoticed.

Gifted students contrasted Seafarers' approach with more stimulating experiences they have had elsewhere. One student, Fin, who had spent time in a school in England, lamented that "It's pure theory here… they put it into practice once a semester" whereas in England "teachers used different methods like practical work in lab… more entertaining…". Another student, Mark, observed that "they only make you think in the STEM lab; in class it's just theory" he goes on to say that "you do things by hand in the STEM room. It's a subject." These comments suggest that any hands-on or creative STEM learning at Seafarers is relegated to rare, special occasions rather than integrated into everyday lessons. As a result, many gifted students have developed coping strategies for boredom such as doing only the minimum work required, pretending to pay attention while their minds wander, or quietly engaging in side interests, with Felix suggesting a cause for that boredom being that "you have to take notes in class then pass them clean." They continue to score high marks on tests – paradoxically masking the problem. As long as they do well in exams with minimal effort, teachers assume "everything is fine," not realising that these students are under-learning and not growing to their full potential. In fact, one insightful student, Jaz, admitted concern that "maybe we're not developing good study habits or resilience, since everything is so easy now… someday when we face a real challenge, we might struggle because" with parents reflecting their concern in saying "they do not need to study at home… they do everything in class".

6.3. Identification of Gifted Students at Seafarers

Seafarers' process for identifying gifted students is another aspect of practice where reality differs from the proactive approach recommended by policy. There is no routine screening or universal assessment at Seafarers to flag high-ability learners early. Instead, identification typically relies on individual initiative, usually by parents, and occasionally by observant teachers, rather than a systematic school-led program with the SEN coordinator commenting that "most have external reports but no centre psychological report". In interviews, teachers reported that the most common way a gifted student comes to light is through outstanding academic performance, consistently high grades or rapid mastery of the standard curriculum. Teachers also watch for qualitative signs of giftedness such as unusual curiosity, insightful questions beyond the curriculum, or a student's tendency to grasp concepts quickly and want to dive deeper. For instance, Alma the maths teacher, noted that a gifted learner often "has no shortcomings" in class work and may display a strong desire to learn more, sometimes even appearing bored or disruptive if not sufficiently challenged. These signs, however, depend on teacher awareness and bias, a student who is underachieving or masking their ability might be overlooked if the teacher equates giftedness only with high grades and model behaviour as was the case with Paul where Elena the Physics teacher describes him as "noisy, lazy and not the best grades in class".

Without any school-wide testing, a gifted identification at Seafarers is usually initiated when a parent or teacher voices a concern and requests a formal evaluation, with the mother of Paul stating that she had "called the school about this at 7 years of age". The school's SEN coordinator can then advise the family to seek an external psycho-educational assessment. In practice, almost all recent gifted designations at Seafarers have come through private psychological reports obtained by parents. Occasionally, these private assessments are complemented by public resources, for example, one family described how their son Felix underwent extensive testing, "nine tests done private, six

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tests by the Community of Madrid," illustrating that the regional educational guidance team can be involved in confirming a diagnosis once the process is started. Generally, though, Seafarers follows rather than leads, the impetus often comes from persistent parents who notice advanced traits or discontent in their child, Felix for example "Started reading from the age of 2" explains his mum, while Paul "Learned to read at the age of three… he had like an advantage at that point" commented Pauls father. Others were driven by problems at school – for example, a child's boredom and refusal to do repetitive homework, or disruptive behaviour born of frustration – which eventually led a teacher or counsellor to suggest "perhaps he should be evaluated."

Once a student at Seafarers is formally identified as gifted, usually by meeting the IQ criteria in an external evaluation, there is no automatically triggered support plan or dramatic change in their schooling. Parents in my study expressed frustration that after going through the arduous identification process, "nothing really changed at school, we have not received any help nor support". In a parent survey, the average rating of Seafarers' identification process was only 2.5 out of 5, with the most frequent response being "1 – very ineffective", with parents expressing that "the system is not efficient to identify gifted children". Many parents felt the school did little to actively find or help gifted learners, essentially expecting families to force the issue themselves – "los padres tenemos que hacer presión para que se les detecte," as one said, meaning parents must pressure the school to get children identified. A few families even chose not to officially inform or involve the school after getting a private diagnosis – one family shared that they kept their son's giftedness confidential because they had "a bad experience with how the older child's identification was handled" and feared the label might stigmatise or pressure him or effect "his self-perception". In such cases, there was an informal understanding with the SEN coordinator, but no formal process. Furthermore, even when a student is identified as high ability, that information is not always effectively communicated to all their teachers. Some teachers reported that they only learned which students were on the "gifted list" well into the academic year, or even because of my study "until a few weeks back". One teacher remarked that she was given the list of gifted students "very late in the second term," and until then "had no idea" that certain boys in her class had been identified as gifted. The communication breakdown means that a student might carry a gifted designation on paper, but if classroom teachers are unaware of it, they cannot adjust their teaching. According to policy, after identification the school should convene the staff to plan appropriate measures, an ACAI or similar enrichment plan for each class. At Seafarers, such coordination rarely happened. The reality was that giftedness might be noted in the student's file but not operationalised in daily teaching practice, a point that will be further explored as a major contradiction between policy and practice.

6.4. Support and Enrichment Opportunities

Beyond the regular classroom, Seafarers does not have a dedicated gifted education program or structured enrichment track for its high-ability students. When asked about whole-school strategies for gifted learners, several teachers bluntly stated there is "no special provision" – especially at the secondary level, aside from the standard curriculum. During observations, gifted students remained in their mainstream classes for all subjects and followed the same lesson plans as everyone else, receiving no additional support such as teaching assistants, special materials, or differentiated assignments. No pull-out sessions or in-class enrichment activities were provided to these students in any of the observed STEM lessons. If Seafarers has an official gifted policy document, as the inclusion policy suggests, its measures were effectively invisible in practice.

One teacher noted that in primary school there had once been some "pilot" enrichment initiatives, but by secondary school "those efforts have waned." The focus of the school is overwhelmingly on delivering the prescribed curriculum and ensuring all students meet the basic standards, which leaves little room for catering to those who could go beyond. Seafarers' written policy does list possible provisions for high-ability students – for example, allowing curriculum compacting, enrichment projects, ability grouping, or acceleration in specific subjects – in line with what the Community of Madrid permits. However, none of these options were actually seen or

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reported in use. In effect, the policy exists on paper but not in practice. As one teacher frankly put it, at Seafarers it's often "identification and done", once a student is labelled gifted, there is no automatic next step to alter that student's educational experience.

The only enrichment opportunities available at Seafarers are extracurricular offerings that are open to all students, not just the gifted. These include clubs and activities such as a science club, a Technology guild and a maths competition typically held during lunch breaks or after school. Indeed, Seafarers has a well-equipped STEM lab, and it is used for voluntary projects – for instance, students who join the technology guild work on hands-on projects like robotics or coding. Such activities can provide an extra challenge and outlet for gifted students who choose to participate. However, they are not integrated into the curriculum or guaranteed for every identified gifted student. Participation is entirely dependent on student interest, parent support, and scheduling; thus, an inconsistent landscape is created. A motivated gifted student with a passion for science might join the club and benefit from it, whereas another equally gifted student who cannot stay after school receives no additional enrichment at all. There is no mechanism to ensure that every gifted learner at Seafarers is engaged in advanced or creative endeavours as part of their schooling. In a way, Seafarers' model puts the onus on the student and family to seek enrichment, much as they had to initiate identification.

When parents were asked "How well does the school support your gifted child?", the average rating was 2.25 out of 5, and the most common answer was "1 – not at all effective." Many parents commented along the lines of "No he recibido ninguna ayuda ni consejo", "I have received no help or advice", regarding what happened after their child was identified as high-ability. One parent said plainly that they had "no hemos recibido nada diferente del colegio," meaning they received nothing different from the school post-diagnosis – no special program, no individualised plan, not even guidance on what to do next. Several families described having to become self-sufficient; they sought out external resources like private tutors or psychologists for counselling their child, weekend enrichment courses at museums or universities, or even enrolling the child in complementary programs such as a Saturday science academy. One parent shared that she had her son attend a Montessori workshop outside of school to get "something more suitable" for his learning style, since Seafarers was not providing any differentiated work. These accounts underscore that Seafarers' gifted students receive essentially the same education as their peers, with any enrichment happening off to the side, informally or outside the school context.

An illustrative – and troubling – example of the school's stance emerged regarding a regional enrichment program. The Community of Madrid offers free Saturday enrichment sessions for identified gifted students from any school – a program where gifted students meet weekly to explore advanced topics and interdisciplinary projects with specialised instructors. One might expect Seafarers to encourage its gifted students to take advantage of the opportunity, especially since the school itself offers little enrichment. However, both teachers and parents reported that Seafarers leadership "advised against going to the Saturday enrichment sessions ran by the community of Madrid". The reasons were not clearly explained; speculation among staff was that perhaps the administration worried these external sessions might promote different educational philosophies that clash with Seafarers' more conservative approach, or perhaps the school was reluctant to admit it couldn't meet the student's needs internally. From the parents' perspective, it was deeply frustrating – it felt like a "mixed message", "We're not giving you extras, but we don't want you seeking them elsewhere either." The disconnect between parents and school leadership highlights a tension, families of gifted children often become advocates for more challenge, sometimes turning to outside programs, while Seafarers' leadership appears hesitant or defensive about such external enrichment. It also emphasises the lack of collaboration – ideally, the school and parents would be partners in supporting the child, but here parents felt they had to work around the school's reservations to get appropriate opportunities for their children.

6.5. Contradictions and Barriers to Implementation

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The data reveal several contradictions between what is supposed to happen and what happens at Seafarers, as well as several barriers that help explain why the school struggles to implement better provision for gifted learners. These issues range from institutional policies down to teacher beliefs and practical constraints.

6.5.1. Policy Versus Practice Gaps

Perhaps the most glaring contradiction is that Seafarers stated policies – and external educational guidelines – are not being translated into practice. Seafarers' inclusion policy explicitly references the need to support high-ability students and aligns with the Community of Madrid's regulations, for example, it permits curricular enrichment, flexible grouping, and even acceleration for gifted students. In theory, once a student is identified, Seafarers should convene a team to create an ACAI (individual enrichment plan) outlining what "curricular extensions or modifications" the student will receive in each subject, and teachers, parents, and the SEN coordinator should collaborate regularly to implement and review these measures. In practice, none of this has occurred. There is a "glaring gap" – as one parent put it – between "what is supposed to happen after a student is identified and what actually happened." Identified gifted students at Seafarers did not receive any formal plan of support, nor did their teachers receive specific recommendations or training on how to adapt instruction. The evidence of the gap is seen in teachers' own surprise at not being informed of gifted students in their classes, and parents' unanimous reports that the gifted label brought "no tangible support with it."

Another contradiction lies in Seafarers' conceptual stance versus classroom reality. The school leadership and policy rhetorically endorse modern, inclusive pedagogy, for instance, documents speak of fostering each student's gifts and call inclusion "the responsibility of all teachers and leadership, not just the support team." Yet the prevailing culture at Seafarers is conservative and exam centric. Teachers noted that any teaching methods deviating from the norm – such as project-based learning or interdisciplinary activities – are "not liked by leadership." There is a clear tension here, on paper, innovation and differentiation are encouraged; in practice, administrative caution and tradition win out, sending implicit signals to teachers to stick to conventional methods. Thus, teachers face a double bind, policy tells them to individualise and enrich, but the school's entrenched routines and expectations push them to teach to the test and the average student. Some teachers admitted feeling "unsure how to proceed" or "out of the game" when it comes to trying something new for gifted students, because they doubt it would be supported or valued.

Furthermore, while the Community of Madrid emphasises early and broad identification, Seafarers' approach remains late and selective. The regional guidelines urge proactive detection of giftedness in the early years of schooling, using teachers' continuous observation and even psychometric screening for any student who shows potential. Seafarers' inclusion policy echoes these ideas in theory. However, in contradiction to that ideal, Seafarers relies on a reactive model where only those students who somehow draw attention, usually by excelling or by parental push, get identified. Many parents highlighted that identification at Seafarers "depends greatly on the teacher's sensitivity". In other words, it's almost happenstance whether a gifted child is noticed running counter to the equitable ideal that every child's ability should be proactively considered. Some gifted students may remain unidentified, and thus unsupported, because they either conform quietly or, conversely, act out and are mislabelled – a lost opportunity the policy framers explicitly wanted to prevent.

6.5.2. Practical Barriers in the Classroom

From the teachers' perspective, several practical barriers make it difficult to implement differentiated or enriched teaching for gifted students. A frequently cited issue is large class size and workload. Seafarers' classes are around 30–32 students each, and a typical teacher teaches multiple classes, often 5–6 different groups each day. Teachers explained that with such numbers, simply managing the classroom and covering the basic curriculum consumes most of their time and energy.

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The idea of preparing additional, individualised materials or supervising separate activities for a few gifted students in the same class can feel overwhelming therefore they aim their instruction at the average level to get the majority through the required content. If they divert attention to create special extensions for the top students, they fear "not completing all required content by the end of term", students at Seafarers must eventually sit the same exams, including important external exams in later years, and teachers feel pressure. As one teacher put it, "Everyone has to know the content given by the Ministry of Education." A second major barrier is lack of time and resources for planning differentiation however they do recognise that "when I do plan, I feel good." A third is limited training and uncertainty with teachers commenting that "I don't know how to support them".

6.5.3. Cultural and Attitudinal Barriers

Beyond logistics, the data uncovered some mindset issues that act as barriers. One is the implicit belief held by some staff that "gifted students will be fine on their own." Because these students usually get high grades and do not fail tests, certain teachers or administrators assume they do not need extra help. The "no failing equals no need" attitude is a misunderstanding of what gifted education advocates for. Gifted learners, even while excelling on grades, may be under-performing relative to their potential if they are never given challenging work. However, in a high-stakes school environment, it's "easy to focus attention on students who are struggling to meet minimum standards"; but to view those who exceed standards as already successful can lead to gifted students being ignored or taken for granted. Several parents sensed this attitude, with one noting that teachers seem content as long as her son is "getting A's," without considering that he wasn't being taught anything new. Likewise, gifted boys themselves perceived that some teachers saw them as an asset rather than a responsibility – for instance Steven the biology teacher commented on Rory as "a well-behaved high achiever who makes the class look good and causes no trouble", so the teacher has no incentive to intervene.

Related is the practice of using gifted students as peer tutors or teacher's helpers, which was observed in some classes. Instead of providing new material to a gifted boy who has finished his work early, a teacher might say, "Why don't you help your classmate who is struggling with the task?" On the surface, it seems positive – it engages the gifted student and aids the peer. Indeed, some gifted students said they didn't mind helping and that it sometimes reinforced their own knowledge. However, peer tutoring was often the only form of "enrichment" offered, and it does not address the gifted student's need for new learning. In some cases, gifted students quietly resented being made into unpaid teaching assistants, feeling that they were being held back by having to work at others' pace. Teachers, too, noted potential downsides, over-relying on the gifted to help others can cause social frictions, peers might perceive them as the teacher's pet or resent their "know-it-all" status, and it doesn't truly challenge the advanced student. The regional guidance explicitly warns against simply giving gifted students "more of the same work" or using them only to support others – instead, it advocates offering "multiple and varied alternatives" to stimulate their own learning. Thus, the well-meaning inclination to enlist gifted students as helpers can become a barrier to their intellectual growth if it substitutes for proper differentiation. It reflects a cultural notion that "keeping them busy is good enough," rather than recognising their right to learn something new.

Seafarers' leadership, according to teachers and parents "tends to favour maintaining the school's traditional methods and reputation". If the administration implicitly or explicitly signals that the status quo is preferred, teachers are disincentivised to experiment with new strategies that would benefit gifted students. Moreover, leadership's stance can affect resource allocation, investing in gifted education, training, smaller groups, special materials, might not be seen as a priority. The SEN coordinator pointed out a truth of the private school context, because they are not compelled by law to do more than identify gifted students, there is no external enforcement or accountability pushing Seafarers to develop comprehensive provisions. Unless the leadership itself champions the cause, improvements may not happen.

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Finally, communication and coordination issues serve as barriers that exacerbate all of the above, the fact that some teachers did not know who the gifted students were until late in the year reveals an organisational lapse. Even after identification, there was no effective mechanism to bring all stakeholders together, teachers, SEN staff, parents, and the student, to formulate a plan. Each teacher was left on their own, and many defaulted to doing nothing special. The lack of regular SEN–teacher meetings, which the policy calls for, means no structured follow-up on gifted students' progress or needs. Teachers also lacked access to the psychologists' recommendations from the official reports, valuable expert advice was never communicated to the teachers who could implement it. This represents a lost opportunity; bridging that gap would likely have required the SEN coordinator or leadership to actively disseminate those recommendations and perhaps workshop them with teachers. Instead, the knowledge stayed on paper. Therefore, poor communication channels and lack of collaborative infrastructure at Seafarers mean that even when good ideas or external guidance exist, they don't reach the classroom.

6.6. Implications for Gifted Provision at Seafarers

The findings above carry significant implications for the quality and outcomes of gifted education in STEM at Seafarers, in essence, the current approach, or lack thereof, means that identified gifted students are not being effectively served, which has both immediate and long-term consequences for those students and the school.

First and most directly, the gifted students at Seafarers are not reaching their potential under the status quo. Despite being labelled as having high ability, they spend much of their school time in classes where they learn little that is new, a form of underachievement in disguise, the students achieve top grades with minimal effort, giving an illusion of success. This illusion of success, over time can erode their love of learning. Several gifted boys conveyed a sense of resignation toward school – they comply and do well enough, but with a blasé attitude because they are seldom challenged or excited by their lessons. Indeed, some students noted they used to love certain subjects, like biology or maths when taught by an engaging teacher or in a different school, but lost interest when confronted with rote teaching at Seafarers. The implication is clear, talent unused is talent diminished. Seafarers' risks turning some of its brightest students into under-motivated learners just coasting by, which is a loss not only for those students but also for the broader society.

Secondly, the social and emotional impact on gifted students should not be overlooked. The data revealed that some gifted boys feel like a "burden" or a "problem" in the classroom simply for needing a greater challenge. For example, when one boy finished his work early and attempted to read a book, to occupy himself, the teacher scolded him, sending the message that seeking additional intellectual engagement is misbehaviour. Such incidence teaches gifted students to hide their abilities or refrain from asking for more, lest they be seen as annoying or arrogant. One parent reported her son internalised that teachers were annoyed by him because "you have to think a little bit more about what to do with him." This is a deeply concerning implication, a child feeling guilty for being advanced, it points to a risk of negative self-concept, gifted students might start toning down their curiosity, or even deliberately underperform, to fit in and avoid drawing attention. Over time, such students may also fail to develop resilience and coping strategies for challenge, because they are never allowed to struggle or exert effort in school, with one student noting "I cannot put my hand up because only the children with difficulties can". Additionally, feeling "penalised" for one's giftedness can lead to anxiety and perfectionism issues. If a child infers that being smart only creates problems, they might oscillate between feeling undue pressure to always excel or feeling anxious about showing any vulnerability. In short, Seafarers' current approach, or lack of a supportive approach, could be fostering unhealthy attitudes in its gifted students: complacency, fear of challenge, or diminished self-worth regarding their talents.

Gifted students are part of the spectrum of learners who have special educational needs, their needs being for more advanced material and faster pace. The current situation at Seafarers, where support for them is ad hoc and dependent on individual teachers or parent advocacy, is inherently

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inequitable. Some students benefit, those lucky to have proactive parents or particularly accommodating teachers like Alma or Ana who gave small extra challenges, while others get nothing extra; the "lottery" approach is not consistent with inclusive education principles, which hold that every identified special-needs student should have a planned support strategy. It implies that without systemic change, provision for gifted learners will remain inconsistent and personality driven. Students who happen to impress the right teacher might get a bit more attention; those who don't will continue to be overlooked. Such inconsistency can breed resentment or at least a sense of unfairness among students and parents. Notably, even the gifted students themselves commented that whether they enjoyed or learned in a class "hinged on who was teaching it" – "It's not the studying but the teacher that makes you good at something," as one boy, Paul, said.

Looking forward, the findings also imply specific areas where changes would yield benefits and the gifted students themselves gave a hopeful vision of what they want: more hands-on projects, more creativity, real experiments, interdisciplinary learning, and deeper dives into topics. They are effectively outlining the very pedagogical techniques that research recommends for high-ability learners. If Seafarers were to incorporate even some of these elements into its STEM curriculum, it could dramatically increase these students' engagement. For example, making STEM classes more inquiry-based or occasionally grouping the gifted students together for a challenging project could provide the sorely needed intellectual stimulation. The students' suggestion of learning "the four things, science, technology, engineering, maths at the same time" in an integrated way is a call for a richer approach to STEM that would benefit not just gifted students but potentially all students by making learning more applied and holistic. Thus, one implication is that the gap between the status quo and best practice is bridgeable, the solutions, differentiation, enrichment, integration are known and even desired by students; it's a matter of school will and teacher support to implement them. If Seafarers addresses the highlighted barriers, for instance, through teacher training, adjusting workloads, or leadership signalling support for innovation – it could begin to close the provision gap relatively quickly.

Finally, at a broader level, these findings highlight a microcosm of the challenge in private education, without external mandates, how can private schools be encouraged or persuaded to adopt inclusive practices for gifted learners? Seafarers' case shows that compliance-oriented motivation is weak. Change is likely to come only if internal values shift or if stakeholder pressure increases. For Seafarers, the voices of parents and students, now documented, could serve as a catalyst. As one student poignantly asked, "What is the point of the 'gifted' label if not given opportunities in life?" The implication is one of urgency – failing to act not only squanders the talents of these students in the present but may also impair their preparedness for future endeavours and deprive society of their full contributions.

6.7. Summary and Transition to Discussion

In this chapter I have revealed that Seafarers College's provision for gifted students in STEM falls significantly short of both regional expectations and the students' needs. I found that STEM teaching remains traditional and undifferentiated, leading gifted learners to experience boredom and stagnation despite their high potential, with Peter commenting "they talk to us like we are stupid." The school's approach to identification is reactive and heavily parent-driven, and critically, once identified, gifted students receive little to no tailored support in the classroom. A combination of factors – large classes, lack of teacher training, a conservative school culture, minimal institutional support, and communication gaps, all contribute to maintaining the status quo. Consequently, the "gifted" label at Seafarers often stands as an empty designation, unaccompanied by meaningful educational adjustment, leaving students under-challenged and parents dissatisfied.

These findings set the stage for a deeper discussion in the next chapter. In the Discussion, we will interpret Seafarers' situation in light of existing research and theories on gifted education and STEM pedagogy. We will explore the broader significance of these results, how do they align or contrast with studies of gifted provision elsewhere? What do they suggest about the role of policy in

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private schools, or about effective strategies to engage gifted learners? The discussion will also consider possible solutions or recommendations for Seafarers and similar institutions. Ultimately, by reflecting on these findings, we aim to identify how Seafarers can bridge the gap between the current state and ideal practice, ensuring that gifted students not only bear the label, but truly benefit from it through an education that challenges and inspires them.

7. Discussion

In this chapter, the findings from Seafarers College are interpreted through the multi-faceted theoretical framework established earlier, weaving together critical analysis with reflective narrative. The goal is to answer the research questions by exploring how the emergent themes from the data relate to broader understandings of gifted STEM education in a bilingual context. Four interrelated thematic lenses guide my interpretation: (1) the synergy between STEM pedagogy and gifted education, (2) the influence of language and identity in a bilingual setting, (3) issues of equity, power, and bias through critical race and gender lenses, and (4) the extent to which gifted STEM education at Seafarers serves as, or could become, an instrument of liberation and humanisation.

7.1. STEM and Gifted Education: Misalignments and Synergies in Pedagogy

One of the clearest findings was that STEM instruction at Seafarers remains traditional, didactic, and largely undifferentiated, which has left gifted learners under-stimulated and disengaged. Both teachers and students described science and math classes as heavily lecture-based, focused on rote content delivery aimed at the average level. As one gifted student lamented, "they talk to us like we are stupid," expressing frustration that lessons neither challenge nor inspire. Such practice stands in stark contrast to the principles of synergistic STEM–gifted pedagogy advocated in the literature. Effective STEM education, especially for gifted learners emphasises inquiry, complex problem-solving, creativity, and student-centred exploration. Likewise, gifted education research calls for curricula built around big ideas, advanced content, real-world problems, and flexible, student-driven learning experiences (Hockett, 2009; National Research Council, 2012). In theory, teaching that truly embraces STEM's integrative, hands-on ethos would naturally cater to gifted students' needs, as both STEM reformers and gifted education experts converge on these pedagogical approaches. However, at Seafarers such a convergence has not been realised and as a result STEM subjects are taught in isolation and as examinable syllabi rather than as platforms for exploration, meaning the inherent synergy between STEM and gifted pedagogies remains untapped.

I see therefore a missed opportunity to create a "dual-rich" environment where improving STEM instruction would simultaneously enhance gifted support. The conceptual framework posited that aligning STEM teaching with gifted best practices, e.g., using open-ended investigations, mentorship, and project-based learning, would benefit all students and especially the gifted, for instance, VanTassel-Baska & Baska (2021) found that when students engaged in student-led science investigations, overall engagement and understanding improved. At Seafarers, by contrast, "we teach to the middle" was an explicit directive from leadership, resulting in uniform pedagogy that ignored those who were ahead. Gifted students, who require greater depth and pace, found themselves with "more of the same" work rather than enrichment – a scenario echoing Máximo's (Máximo et al., 2017) observation that high-ability learners in mainstream Spanish schools often receive only superficial extensions instead of true differentiation. The consequence is a palpable underutilisation of gifted students' potential, consistent with wider research showing that without sustained challenge, gifted learners may disengage, underachieve, or even become "gifted underachievers" (Ford, 2003; Reis & McCoach, 2000). In the study, several identified gifted students were coasting through classes, reporting boredom and lack of motivation, which aligns with Ford's findings that inadequate stimulation leads to under-performance.

Why has Seafarers fallen into such patterns despite its resources and rhetoric? A critical factor is teacher agency and professional culture. The framework highlights that teachers are the key in converting a student's potential into achievement (Gagné, 2015). At Seafarers, however, multiple data

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points indicated that teachers felt constrained by a rigid syllabus, high-stakes exams, and top-down mandates, leaving them disempowered to innovate. One teacher described feeling bound to "teach to the test" and feared negative repercussions for deviating from the set curriculum – a fear not unfounded given that two STEM teachers were dismissed after student complaints about confusing lessons, reflecting a culture where compliance trumps creativity, and as Fullan (2016) notes, sustainable pedagogical change is unlikely when teachers are mere implementers of others' directives rather than co-creators of practice. Seafarers provided minimal training in either gifted differentiation or bilingual instructional methods. Teachers were expected to simply "teach as usual but in English" – an approach that proved a "recipe for superficial learning and teacher demoralisation" (Hidalgo-McCabe & Tompkins, 2024). In my own reflective account, adopting active learning strategies in Technology class (e.g., hands-on projects, collaborative problem-solving) led to far better engagement than the prevalent lecture model. My personal insight reinforces the literature's insistence that active, student-centred pedagogy is essential, not optional, in a bilingual STEM setting.

Restoring the synergy between STEM and gifted education at Seafarers will require reforming the curriculum and empowering teachers. The findings suggest a need for curriculum reform to move away from strictly exam-aligned content coverage toward a more integrated STEM approach, to involve curriculum compacting (Tomlinson et al., 2003), inquiry-based projects, interdisciplinary STEM challenges, and tiered assignments that allow gifted students to delve deeper (Watters & Diezmann, 2003). For example, instead of covering science topics via notetaking, teachers might guide students to design experiments or engineering projects addressing real-world problems, aligning with both gifted education best practices and 21st-century STEM competencies. Importantly, such changes hinge on teacher training and agency. Teachers must be provided targeted professional development on differentiated instruction and bilingual pedagogy, as well as permission to experiment without fear. The data revealed that Seafarers' teachers often equated "rigour" with covering more content – a mindset that leadership can help reshape by valuing depth over breadth and critical thinking over rote coverage. By involving teachers in co-designing new STEM enrichment units the school can tap into their expertise and increase their ownership of changes. My own journey, in fact, underscores how crucial reclaiming teacher agency is feeling voiceless under a one-size-fits-all regime, myself I turned to research to "reclaim some of my professional agency" and help colleagues do the same, thus resonating with Maltmans (Maltman et al., 2021) argument that educators must align practice with their professional values and philosophy. For Seafarers, nurturing teacher agency could mean the difference between a stagnant status quo and a vibrant culture of innovation where the natural overlap between robust STEM pedagogy and gifted education is finally realised.

Pedagogical misalignment at Seafarers highlights that without deliberate effort, a bilingual STEM program can devolve into mediocre instruction that fails gifted learners. However, the findings also point toward a hopeful synergy, by embracing the integrative, inquiry-based approaches advocated in both STEM and gifted education literature, Seafarers can create a learning environment where gifted students are consistently challenged within the mainstream classroom. To perform such a change requires empowering teachers through training, trust, and involvement in curriculum reform.

7.2. Language, Identity, and Giftedness in a Bilingual Context

Seafarers College operates in a bilingual environment, Spanish and English, which emerged as a double-edged sword in the case study. On one hand, the bilingual program is a point of pride, aligned with the school's mission to produce globally competent students. On the other hand, the data revealed that language barriers and monolingual biases often interfere with recognising and nurturing giftedness. Both teachers and students reported that learning STEM subjects in English sometimes obscured true understanding and interest, e.g., students who were conceptually advanced struggled to express themselves or excel in assessments due to limited English proficiency, and teachers admitted they might not "see" a student's potential if he wasn't fully articulate in English.

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This dynamic is backed by literature warning that rigid English-only instruction can mask students' abilities and dampen their engagement. Golden (2024) provides a telling example of a bilingual student being admonished to "say it again in English", illustrating how a focus on language correctness over content can send the message that the student's home language is a deficiency. Such subtractive language policies undermine the promise of additive bilingualism and risk alienating bilingual gifted students. In context, the emphasis on Cambridge English exam prep at Seafarers, where success was measured by language certificates more than by STEM learning, exemplifies how language dominance was prioritised at the expense of deeper learning, likely contributed to some gifted students' disengagement; as one student noted, in Spanish-medium classes he "knows what's expected," but in English-medium science, unclear instruction led to confusion and misbehaviour. The school ultimately had to switch some STEM classes back to Spanish after recognising the problem. It becomes therefore evident that any model of gifted education at Seafarers must be culturally and linguistically responsive. Giftedness should not be construed as a monolingual English phenomenon. On the contrary, a bilingual gifted learner's full intellectual capacity will only shine if both languages are seen as assets in learning.

The literature advocates strategies like translanguaging, where students can fluidly use both languages to process complex ideas. In a translanguaging STEM classroom, a gifted student might discuss a challenging problem in Spanish to grasp its nuances, then present the solution in English, leveraging his complete linguistic repertoire for higher-order thinking (García & Wei, 2015; Golden, 2024). Seafarers currently lack flexibility; teachers reported feeling that allowing Spanish in "English" classes was against policy, even when it could aid understanding. The framework and Golden's research would suggest that the policy needs revisiting, rather than enforcing English-only, teachers can permit strategic use of the first language as a scaffold. Doing so not only helps with content mastery but also affirms students' cultural identity, which is crucial for engagement. If a gifted student's identity as, say, a Spanish speaker is devalued, he may disengage or resist participating, a point supported by studies on identity safety (Steele, 1997) and linguistic bias in gifted identification (Ford, 2013). Indeed, Ford (2013) found that traditional identification methods often favour native speakers of the dominant language, since both testing and teacher referrals carry language and cultural biases, calling for multifaceted identification approaches at Seafarers that can capture ability without demanding perfect English fluency. For example, nonverbal portfolios of work could be used alongside teacher nominations, and teachers should be trained to look for signs of advanced thinking that might be expressed nonverbally or in a mix of languages. The earlier literature review noted that modern identification protocols emphasise multiple criteria and the use of assessments in a student's dominant language where possible. In practice, however, Seafarers relied almost entirely on external IQ tests or parent advocacy for identification – meaning students who didn't have strong parent support, or obvious high scores could slip through the cracks. One gifted student in the study, for instance, was never formally identified until his mother paid for testing, despite teachers noticing his science curiosity; the teachers hadn't referred him earlier partly because his English grades were average.

Culturally responsive gifted education also means validating students' identities within the curriculum. Seafarers' gifted students expressed that they didn't feel "known" by the school, their unique passions or cultural backgrounds were never reflected in the classroom. While the student body is largely homogeneously Spanish and Catholic, a few students came from different cultural or linguistic backgrounds. At Seafarers, gender is uniform which removes one axis of diversity in the student population, yet it's worth noting that this uniformity also means a lack of female perspectives and role models in STEM. Although not captured directly in the data a feminist lens reminds us that single-sex environments can sometimes reinforce gender stereotypes in curriculum and pedagogy. For example, without conscious effort, an all-boys science class might unconsciously lean into male-centric examples or competitive dynamics that could be alienating. Thus, any gifted STEM model developed at Seafarers, if translated to other contexts or a future co-ed setting, should proactively address gender inclusivity, ensuring that pedagogies are inviting and empowering for all genders.

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Returning to the immediate bilingual context, the professional implications of these findings are that Seafarers needs to consider teacher training in bilingual education strategies as a form of capacity-building for gifted education. The data showed that many of the STEM teachers had little background in how to teach content in a second language; as a result, they often defaulted to traditional lectures that neither supported language development nor extended learning for the gifted. My own experiences, documented in a prior article, Xhuxhi and Ramírez-Verdugo (2024), confirmed that active learning and allowing translanguaging improved student understanding and motivation in bilingual STEM classes. Moreover, embracing students' cultural identity in class can make gifted learners feel seen and valued, which is linked to better socio-emotional outcomes and academic performance (Delavan et al., 2021). Seafarers' inclusion policy already nominally recognises high-ability students as a group with special educational needs, but this policy must be enacted in culturally responsive ways. For instance, the policy could be updated to state explicitly that identification procedures will be free of linguistic bias, and that teachers should use culturally diverse examples in STEM lessons to connect with students' backgrounds. These might seem like minor tweaks, but they send a message that giftedness is not measured by one's accent or family pedigree, it's a broad potential that can manifest in any language.

7.3. Conceptions of Giftedness, Equity, and Bias: A Critical Perspective

Teachers and school leaders professed to value high-ability students, yet in practice there was no clear, shared definition of what being "gifted" entails – nor a systematic approach to identify and support such students. The analysis found that identification was "reactive and heavily parent-driven," meaning that students were often labelled gifted only after parents initiated private testing or pushed for recognition. Interpreted through a critical race and class lens, this scenario raises concerns about equity and bias. Who gets identified as gifted in a system that relies on parent advocacy? Likely, it is the students with well-informed, resourceful, and assertive parents, in other words, those from more privileged backgrounds. At Seafarers, most students are relatively privileged; even so, not all parents have equal social capital. Some may be more aware of the pathways to get their child tested or may feel more entitled to request special services and so this can skew the identification pool towards certain demographics. The conceptual framework, drawing on CRT, prompts exactly these questions: "Whose knowledge and cultural norms define giftedness at Seafarers? Who is being left out or overlooked?". Ladson-Billings and Tate (1995) argue that racism and classism in education often operate subtly, privileging those who already have cultural capital. At Seafarers, while overt racial diversity is limited, through a CRT lens I would note that the school's practices might still systematically favour the dominant cultural group, the archetype of the "ideal Seafarers student," who is well-behaved, performing adequately in all subjects, and supported by proactive parents. Teachers, when asked how they recognise giftedness, often mentioned traits like high grades, good behaviour, or participation in class. These criteria, however, may reflect a bias towards compliant high achievers rather than creative or unconventional thinkers. One teacher admitted that the students who gave him the most trouble never struck him as possibly gifted until the research project prompted him to reconsider. In Seafarers' case, no formal mechanism existed to solicit teacher nominations for gifted identification in any broad way; it was typically after a psychoeducational report came in that teachers were informed a student was gifted. The lack of a proactive, multifaceted identification system is at odds with best practices discussed earlier (Baldwin, 2005; Siegle et al., 2014). It also has equity implications, without universal or teacher-led screening, "invisible" gifted students, perhaps those from less obvious backgrounds or those who are twice-exceptional, gifted with a learning disability, may remain invisible. The data did not explicitly find instances of racial bias, since racial diversity was minimal, but it did find socio-cultural bias, students who were quirky, underachieving in certain subjects, or English-language learners were not typically flagged. Nationally, it echoes Spain's situation where an estimated 90% of high-ability students go unidentified due to issues clearly mirrored at Seafarers. Rather than waiting for parents to request an IQ test, the school could implement regular screening at certain grade levels. Any such process must

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be designed to minimise cultural and linguistic bias. The goal would be to cast a wider net to catch the less obvious gifted students. Additionally, teacher training on the evolving conceptions of giftedness is needed. As discussed in the literature review, modern theories view giftedness as developmental and domain-specific, not a fixed global trait. Sharing models like Renzulli's Three-Ring Model or Gagné's Differentiated Model of Giftedness and Talent with the faculty could help broaden their understanding of what giftedness looks like. Teachers should be encouraged to refer students who show potential or passion in a specific area, even if they are not top of the class across the board – moving away from the gatekeeping mentality of "only 2% can be gifted" or "gifted means universally high-achieving." In doing so would likely lead to increased numbers of identified students, which might initially strain resources, but ultimately, it's a step toward inclusion.

The data exposed a cultural barrier whereby some staff believed that "gifted students will be fine on their own", this neglect attitude is not benign at all; it results in gifted learners languishing and even developing bad work habits or boredom-induced behaviours problems. Professional development should address these myths, using research evidence to show that without appropriate challenges, gifted students often do not reach their potential and can become underachievers (Ford, 2013; Reis & McCoach, 2000). Teachers might also benefit from hearing students' own testimonies, for instance, listening to a gifted student talk about how disengaged he feels when material is too easy could humanise the issue.

The critical perspective ultimately pushes Seafarers to question for whom its gifted program is working. Right now, it appears to work for almost no one, identified students aren't getting much, and unidentified ones are certainly getting nothing extra. The data suggest that better communication and collaboration with parents could help here as well, especially with parents who might not know they should speak up. Such a stance sets the stage for the final discussion, how can gifted STEM education become not just an elite program for a few, but an instrument of liberation and humanisation that uplifts both individuals and the community?

7.4. Gifted Education and STEM as Instruments of Liberation and Humanisation

A striking contrast emerged between Seafarers College's founding vision of holistic, values-based education and the on-the-ground reality of its pedagogy. The school's mission, rooted in Catholic education principles, speaks of helping students "inquire about the ultimate meaning of [their] journey" and cultivating each student's unique gifts, such philosophical ideal aligns with viewing education as a humanising, liberating endeavour – much like Freire's conception of education as the practice of freedom (Freire, 1970, 1998). Yet, as documented in the findings and my reflections, the daily experience at Seafarers fell short were the pressure to achieve external benchmarks created a kind of oppressive environment for both teachers and students. Teachers felt they had to strictly "deliver" curriculum, and gifted students felt they had to stifle their curiosity to fit the one-size-fits-all lesson.

However, the very recognition of this gap has spurred a desire for change, which is a liberatory process echoing Cammarota and Fine's (2008) notion. Indeed, by involving colleagues and students in discussions about the findings, this study acted as a small intervention to break the silence and top-down hierarchy at Seafarers. Teachers who once felt marginalised by the "covenant" between leadership and parents began to see that their insights could shape future gifted provision, a reclaiming of professional agency and collaborative empowerment. In one of the action research discussions, for example, STEM teachers suggested ideas for a pilot enrichment program, they proposed a student-led "Excellence Program" subject option where high-ability students could work on self-chosen STEM projects with mentorship, an idea very much in line with the liberation framework as it positioned students as co-creators of knowledge, engaging in inquiry that matters to them, rather than passive consumers. The act of proposing the "Excellence Program" was significant, as it signalled that teachers and students were beginning to envision how STEM and gifted education at Seafarers could be different, more exploratory, more empowering, and truer to the school's ideal of "inspiring innovative leadership" in students.

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The concept of STEM for what? is central here. Currently, STEM at Seafarers is for passing exams, for individual achievement, and perhaps for prestige. The liberatory perspective invites us to imagine STEM education as a vehicle for social awareness and humanisation. For instance, what if gifted STEM students engaged in projects that addressed real community issues – say, designing a rainwater capturing and-saving system for the school or creating an app to help local elderly people navigate services in the local area? Such projects would not only stretch their intellects but also connect to ethical and societal dimensions, fostering what Freire calls critical consciousness. The framework referenced the idea of transformative pedagogy that poses "disorienting dilemmas" (Mezirow, 2000) to students in STEM. In the study, one gifted student mentioned his passion for environmental science and lamented that in class "we never talk about the why – like why science matters for the world, it's just formulas", underscoring a hunger for meaning and relevance.

Furthermore, gifted education itself can be an instrument of liberation when it focuses on uplifting all gifted learners, including those from disenfranchised groups. While Seafarers' student body is not very socioeconomically diverse, the principle still applies, a gifted program should aim to find and nurture talents that haven't been traditionally valued, including students gifted in areas the school hasn't historically honoured, maybe a brilliant artist or a social leadership talent, not just STEM test-takers. In a broader sense, if Seafarers develops a model that genuinely caters to its gifted students, it could serve as an example to other bilingual schools, many of which similarly struggle to go beyond "teaching to the middle". There is a potential ripple effect of liberation, sharing a new model could help humanise education in other contexts by showing that even within the constraints of curriculum and testing, there are ways to centre student agency and individual growth.

Administrative support is crucial here; leadership must allow flexibility in scheduling and must protect teachers who take instructional risks in the name of deeper learning. The fact that previously teachers were dismissed for deviating from the norm had a chilling effect; to counter that, leaders might explicitly encourage experimentation and even tolerate initial failures as learning opportunities. Teacher agency, as previously discussed, is key to any liberatory education practice. If teachers at Seafarers become true partners in innovation, rather than passive implementers, they will likely feel a renewed sense of purpose and motivation. It's worth noting that I remained at the school specifically to try to be a change agent, reflecting a personal commitment to what Freire (1998) calls "teaching as an act of love and courage". That kind of commitment from educators is a powerful resource; harnessing it requires a school environment where critical reflection and action are encouraged rather than suppressed.

A school that genuinely lives out an education of liberation tends to be one where all students feel valued and challenged, not just the gifted. In my case, focusing on the gifted has been a lens to reveal systemic issues, addressing those issues will benefit everyone. Teaching to the middle serves no one well; teaching to each student's potential, in contrast, lifts the collective performance and morale.

7.5. Implications for Seafarers College: Towards an Inclusive, Empowering Gifted STEM Program

For Seafarers College to truly support gifted STEM learners, changes are needed on multiple fronts, pedagogical, structural, and cultural. These changes carry several key professional implications for the school.

7.5.1. Curriculum Reform

The analysis underscores the necessity of moving beyond a rigid, test-driven curriculum to one that embraces *differentiation, integration, and depth*. Seafarers should consider revising its STEM curricula to include inquiry-based modules, interdisciplinary projects and opportunities for acceleration or independent study for those who demonstrate readiness. The curriculum is flexible enough to allow "teachable moments" if a gifted student shows interest in a quantum physics concept, the teacher should feel able to explore that, even if it's beyond the standard school syllabus. Importantly, any reform should also incorporate bilingual strategies as discussed, ensuring content

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is accessible in both languages and that linguistic skills are developed alongside scientific skills. By doing so, Seafarers can fulfil its dual promise of bilingualism and academic excellence. International models and the literature (e.g., National Research Council, 2012) provide guidance on such curricula, but the school will need to tailor these ideas to its context, possibly co-constructing units with input from teachers and even students.

7.5.2. Teacher Training and Professional Development

The discussion chapter highlights gaps in teachers' preparation to differentiate for gifted students and to teach in English in an engaging way, therefore, a robust training plan is needed to focus on topics like, strategies for enriching and compacting curriculum, identifying and supporting gifted students and bilingual pedagogies. Given that teachers are often pressed for time, the school might integrate such programs into existing meeting structures or collaborate with external experts. Another powerful approach is creating professional learning communities (PLCs) within school hours, where teachers regularly meet to plan differentiated lessons, share experiences of what worked or didn't, and analyse student work from gifted learners to adjust their teaching. The role of teacher agency cannot be overstated here, training should not be top-down "this is how to teach better" only, but rather participatory. For instance, teachers could inquire into their own practice by experimenting with a new strategy, open-ended experiments in class and then reflecting as a group on student outcomes thus echoing the action research orientation of the study and turns professional development into an ongoing, empowering process rather than a one-off mandate. Research by Frances Hunt (Bourn et al., 2016) suggests that when teachers feel both the need for change and confidence in their ability to effect it, real innovation happens. Thus, investing in building both skill and self-efficacy among Seafarers' staff is critical.

7.5.3. Teacher Agency and Leadership

Closely related to training is the broader issue of teacher agency, and this study has shown that not teacher indifference, but rather teachers marginalised role in decision making and fear of repercussions that has led to issues relating to provision for gifted students. School leaders should actively involve teachers in policy formation, for example, revisiting the gifted identification and support protocol as a committee that includes classroom teachers, not just administrators or psychologists. Additionally, giving teachers space to lead pilot initiatives with administrative backing would demonstrate trust. It's encouraging that the overarching research question for this study aimed to co-construct a model of support with stakeholders, the findings from that co-construction should be heeded. Teachers at Seafarers voiced ideas such as creating a shared database of enrichment resources and establishing mentorship pairings. The school can capitalise on these ideas by formalising them. Recognising teacher efforts publicly, for example, praising a teacher who tried a new differentiated lesson during a staff meeting, can also reinforce a positive culture. The transformation toward an agency-driven environment may require courageous leadership given the conservative culture. Leaders might need to dialogue with the founding community and parents to explain why letting teachers adapt lessons and occasionally deviate from the textbook is in the students' best interest. Framing it in terms of improving the much-valued "academic excellence" could help; for instance, citing evidence that differentiated instruction can raise overall achievement and keep talented students from underachieving will resonate.

7.6. Inclusion Policy and School-Wide Practices

Seafarers College should refine how it integrates gifted education into its overall inclusion strategy, Spain's educational framework treats giftedness as a special need (NEAE), meaning schools are expected to make adaptations. Seafarers' current policy mentions flexibility like enrichment or acceleration, but practice lags far behind. To bridge the gap, the school could establish a Gifted Education Coordinator role or committee responsible for ensuring policy is enacted not only to

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maintain a register of identified students, helping teachers develop Individualised Education Plans (IEPs) or "learning contracts" for each gifted student and monitoring progress but critically to also serve as a liaison with parents, communicating what the school is doing for their high-ability child, which findings show is crucial since parents were feeling dissatisfied with the lack of action. Inclusion must also mean embracing diversity within giftedness, including linguistic diversity, socioeconomic diversity and even diversity of abilities. The school's inclusion policy could be updated to specify that multiple methods will be used to identify gifted students and that every identified student is entitled to certain provisions. Those provisions might be listed as a menu, differentiation in class, enrichment activities, socio-emotional guidance, and periodic evaluation of their progress. Moreover, aligning with regional guidelines and tapping into external resources, for example, collaborating with the Community of Madrid's programs for gifted youth or networks of other schools, could bolster Seafarers' capacity.

The findings of this study, suggest that the current shortcomings are surmountable in that there is nothing inherent in Seafarers that prevents it from having an excellent gifted STEM program, the students are eager, if currently bored, many teachers are capable and care deeply, if given the chance to shine, and the school has material resources aplenty, modern labs that just need to be better utilised. The disconnect has been largely one of vision and will. Now, with evidence and insight from this study, Seafarers College can chart a way forward to co-design a model of gifted STEM support that is context-responsive and grounded in theory. Such a model, it is hoped, will not only benefit Seafarers, by bridging the gap between its aspirational philosophy and classroom reality, but also serve as an inspiring example to other bilingual schools grappling with similar tensions. In essence, the professional and moral imperative is clear, gifted STEM education at Seafarers should not be about an elitist label or exam results, but about liberating potential and nurturing the whole person, which in turn will enrich the entire school community.

The next chapter will conclude the study by summarising how the findings and discussion answer the overarching research question and by offering concrete recommendations and reflections for practice moving forward, thereby closing the loop between research and actionable change.

8. Conclusion

In answer to the central research question, the study concludes that a school-specific model of support for gifted STEM students can be co-constructed at Seafarers through stakeholder collaboration and research-based strategies. The resulting model is tailored to Seafarers' context, including its bilingual environment and school culture, yet it embodies general principles of gifted education that make it relevant beyond a single institution. Its key elements include a broadened definition of giftedness, a more inclusive identification process, enriched STEM learning opportunities, and enhanced teacher capacity. Importantly, the model is both context-sensitive and generative, it remains attuned to local needs while drawing on theories such as Renzulli's and Gagné's frameworks to ensure its core practices align with broader best practices (Gagné, 2004; Renzulli & Reis, 2014; Subotnik et al., 2011).

Through reflective dialogue, the research surfaced practical ideas to address gaps identified. For example, teachers suggested creating a shared enrichment resource bank and establishing mentorship pairings to provide gifted students with additional challenge. In one action-research session, STEM teachers and students even co-imagined an "Excellence Program" elective where high-ability learners could pursue self-directed STEM projects with mentorship. These stakeholder-driven insights directly informed the support model, ensuring it was grounded in the lived experiences of the Seafarers community as well as in scholarly recommendations (Jolly & Robins, 2021; Renzulli & Reis, 2014; Subotnik et al., 2011; VanTassel-Baska & Stambaugh, 2005).

A cornerstone of the new model is a teacher-facing STEM talent identification rubric (Appendix 10.14) to promote inclusive, holistic recognition of potential. The rubric addresses the previously ad hoc identification process by equipping teachers with a practical tool to notice and nurture giftedness in multiple forms. It frames identification as a "holistic process" focused on patterns of strengths

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rather than one-off test results (Gagné, 2004; Jolly & Robins, 2021; VanTassel-Baska & Stambaugh, 2005). It urges teachers to use "a balanced mix of data" and notes that giftedness can manifest in diverse ways, cautioning against pitfalls like over-relying on grades or conflating giftedness with good behaviour. The rubric's criteria span cognitive ability, academic performance, classroom engagement, creativity, and motivation, while also including contextual indicators often overlooked in traditional identification. For instance, it points out that a gifted student might "finish early" and grow bored or perfectionistic when under-challenged, or that limited enrichment opportunities could be hiding a learner's true ability, even a teacher's intuitive sense of "something extra" is recognised as a valid signal of potential (Renzulli & Reis, 2014; Subotnik et al., 2011). By acknowledging these subtler signs, the rubric ensures that non-traditional or underrepresented gifted learners are less likely to be missed (Gagné, 2004; Jolly & Robins, 2021; Renzulli & Reis, 2014; Subotnik et al., 2011; VanTassel-Baska & Stambaugh, 2005). By shifting to an active, teacher-led identification process, Seafarers moves away from a narrow "gatekeeping" mindset, aligning with modern models that emphasise talent development over fixed IQ cut-offs. In short, the rubric operationalises the model's commitment to equity by casting a wider net for STEM talent and giving educators confidence to support budding innovators.

Despite these conclusions several limitations must be noted, the study was confined to a single school with a small sample of participants, which limits the breadth of perspectives and the generalisability of the findings. The proposed model is tailored to a private bilingual secondary school, and may require adaptation in other settings. Time was also a constraint, the research took place in a limited timeframe, allowing for the design of interventions, such as the rubric, but not their term implementation or evaluation. Moreover, the researcher's insider role as a staff member at Seafarers, while facilitating access and trust, carries a risk of bias. Participants may have been guarded in offering criticism, and the dual role required careful reflexivity to avoid undue influence on the analysis. Thus, the model should be viewed as a preliminary framework that warrants further testing and refinement.

Future work should concentrate on translating the model into sustained practice and evaluating its impact over time and key next steps include implement the identification rubric in classrooms and gather feedback on its usability and effectiveness. A pilot will fine-tune the tool's criteria and ensure it truly helps teachers recognise gifted students consistently. Co-creating an "Excellence Program", develop the proposed STEM enrichment program in collaboration with students and teachers, as participants suggested. It would also be interesting to monitor the progress of students identified and supported under the new model over two years. Tracking academic outcomes and STEM engagement long-term will help gauge the model's effectiveness and guide any needed adjustments.

This IFS demonstrates that meaningful improvements in gifted STEM provision are achievable when a school embraces collaboration, reflection, and evidence-based innovation. By co-constructing a support model that is sensitive to context, Seafarers College has taken important steps toward a more inclusive and empowering approach to gifted education. It not only stands to better serve its own students but also offers valuable lessons for other educational contexts seeking to nurture STEM talent and potential.

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