Exploring and Empowering Transition Stories

a narrative inquiry of students' transition experiences into an International Baccalaureate Middle Years Programme Mathematics classroom.

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Author's declaration: This thesis is my own work and has not been submitted for the award of a higher degree elsewhere.

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Abstract

A recent literature review (Kaur, McLoughlin, & Grimes, 2022) highlighted the limited research surrounding the transition into secondary school mathematics from outside of the UK. This study added an international perspective. Set in an International Baccalaureate (IB) school in Hong Kong, the experiences of 15 students beginning the Middle Years Programme (MYP) mathematics course were explored through a combined case study and narrative inquiry approach. Stage-Environment Fit Theory and Self-Determination Theory provided a dual lens for analysing student needs and the responsiveness of the school environment to those needs.

Thematic analysis constructed the key themes of: (1) students expect change; (2) students value progress; (3) students value comfort; (4) students value purposeful and interesting learning experiences; (5) students value transparency; and (6) other people play a role in the transition. The study found that although students shared similar values, the specific form and extent of these values were diverse. These differences were attributed to factors such as primary schooling, prior attainment, mindset, and motivations for learning.

These findings informed recommendations that leveraged existing components of the IB curriculum: the Approaches to Teaching component of differentiation, the Approaches to Learning skill of self-management, the addition of clarity to MYP components, and the utilisation of the Service as Action for a buddy system. In addition, the appreciation of the distinct school contexts existing globally, and the valuable insights gleaned from the narrative inquiry approach in this study, inspired a recommendation for individual schools to prioritise student voice and agency when designing transition interventions.

Keywords: transition, primary school, secondary school, mathematics, Middle Years Programme (MYP), International Baccalaureate (IB), narrative inquiry

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Finally, all glory be to God; He who promised is faithful (Hebrews 10:23).

“Stories are a communal currency of humanity.”
(Shah, 2007)

Chapter 1 - Introduction

Secure understanding and strong attainment within the area of mathematics have been associated with greater options for further education, a wider range of career opportunities, and a more positive outlook for financial wellbeing (Koedel and Tyhurst, 2012). In many countries with compulsory schooling, the expectation is that an individual should have studied the subject at least up until the age of 16, and often to the age of 18 (Hodgen et al., 2010). Depending on the aspirations of the individual and the doors they want to keep open, students need to display reputable academic achievements at a certain stage. This often means satisfactory reports or grades from the institution they are associated with during these crucial years: their secondary school.

Research has shown that the transition into secondary school can impact the long-term well-being of a student (West, Sweeting, and Young, 2008), emphasising the importance of this phase. In an international school setting, additional factors come into play. Here, peers may come from different nations, cultures, languages, and educational backgrounds. This diversity leads to a range of perspectives (Acquah and Commins, 2016), including varied perceptions of the transition period. In addition, while mathematics is sometimes viewed as a universal language (Adoniou and Qing, 2014), its teaching and learning are shaped by the local context and cultural influences (Yang, 2017). As a result, starting secondary mathematics in a transient, international classroom can potentially be a challenging experience.

As a UK-trained mathematics teacher working in an international school in Hong Kong, my interest in this area of research emerged from my own classroom experiences as well as discussions with colleagues, both within my school and in the wider teaching community. I noticed that many of our students demonstrated strong skills in numeric and algebraic processes but

often struggled when faced with more inquiry-based learning, particularly when it came to generalising their findings from investigations or applying their knowledge to unfamiliar contexts. At the same time, I observed another group of students, more accustomed to student-centred approaches, who faced different challenges when transitioning into secondary mathematics. These students appeared to find the increased academic rigour difficult to navigate, as the curriculum seemed to shift away from the more open-ended learning experiences they were familiar with. Witnessing these patterns first-hand, alongside many other subtle issues students encountered, led me to wonder what challenges students were facing, who was encountering them, and why. My research, therefore, grew out of a desire to better understand any challenges and to play a role in resolving them.

Therefore, one aim of this study is to explore how students in this early period of learning mathematics in an international secondary school can best be supported. A recent review on primary to secondary transitions within the context of mathematics and science (Kaur, McLoughlin, & Grimes, 2022), highlighted the dearth of research outside of the UK. This systematic literature review advocated for future research to focus on international comparisons to promote global collaboration and the sharing of best practices. As a result, the gap addressed is from an international perspective, both in location and in the school context.

This chapter will begin by providing further context and defining key terms. It will then outline the research on the primary-to-secondary mathematics transition, emphasising the lack of studies within the curriculum of focus and explaining why this gap is problematic. The chapter will also clarify the aim by presenting specific research questions and defining the scope of the study. Finally, it will discuss the significance of addressing these questions and their potential impact on educational stakeholders, while acknowledging the limitations of the study by highlighting its constraints.

1.1 Background

The transition being referenced typically occurs around the age of 11, but different countries and systems use a range of terminology to reference the pre- and post-transition phases. To maintain a common language, year 6 will be used to refer to the last year of primary school, while year 7 will refer to the first year of secondary school.

Due to this transition coinciding with adolescence, which can bring its own turbulence (Symonds, 2015), and frequently involving the move to a larger environment, transition research in this area has often focused on the emotional and physical implications of this move, which are often viewed negatively (Harris and Nowland, 2020). Looking specifically at mathematics, fewer studies exist, and those that do indicate an academic decline (Evans and Field, 2020).

While international schools have been present for at least 80 years (Hayden and Thompson, 1995) the landscape of the environment has evolved considerably, with student populations shifting from predominantly expatriate children towards an ever-increasing intake of students from the host country (Bailey, 2015). This change reflects the well-researched globalisation of education (Spring, 2008). Furthermore, it reflects the perception among some parents that international schools provide a better foundation for future opportunities in comparison to local schools (MacKenzie, 2010). As economies become increasingly interconnected and globalised, parents may perceive international education as a means to develop the English language skills of their children, which can be considered as a tool that benefits the future of their child (Ng, 2011). Additionally, some parents appreciate the philosophy often associated with international schools and believe they offer a more holistic development for their child in comparison to local schools.

Regardless of motivation, this changing landscape implies that the student populations within international secondary schools will continue to become more diverse. Some children from the host country of these schools will have

attended international schools in their primary years, while others will have moved from the local school system. Coupled with this, the children of expatriates will still be joining from various contexts and countries. While the student population is diverse, so are the curricula on offer in these international schools. However, one that has been increasing in popularity is the Middle Years Programme (MYP) offered by the International Baccalaureate (IB).

The IB initially gained popularity through the offering of its post-16 educational system, the Diploma Programme (DP). It had a strong reputation due to its perceived preparedness for university (Frank-Gemmill, 2013). While the DP began in 1962 (Bunnell, 2011), the MYP was implemented in 1992 with the goal of developing internationally-minded students as well as preparing them for the academic rigour in the DP. The MYP was created for secondary schools and the Primary Years Programme (PYP) for the youngest of schoolchildren, aged 4-11, in 1997. Later the Careers-Related Programme (CP) was introduced as an alternative route to the DP, to complete the IB continuum.

The IB organisation is grounded in an educational philosophy that shapes the framework across its programmes (Hughes, 2014). Their holistic mission exemplifies a growing trend in education towards more meaningful and student-centred learning experiences. This is reflected elsewhere through teacher guidance (Pampaka et al., 2022) and thoughtfully designed curricula (Garrett and Nelkon, 2024), indicating an evolution of educational aims. Although this perspective is not universally adopted, with some contexts still focusing largely on knowledge and skills (Akhter, Akhtar and Abaidullah, 2015), the awareness of shared values in other contexts suggests that the findings of this study may be applicable beyond the IB community.

The MYP is a framework rather than a prescribed curriculum (Harrison, 2015) offering guidance rather than enforced structure. This is significant as it indicates that even a student transitioning from an IB school may experience a different implementation of the framework. So those

transitioning from non-IB schools will almost certainly experience a change in their teaching and learning. These changes may include the focus on teaching through inquiry, teaching for conceptual understanding, the development of transferable learning skills, authentic problem solving, and critical reflection. These elements can be seen in the four equally weighted objectives of the MYP Mathematics framework:
Objective A: Knowing and Understanding
Objective B: Investigating Patterns
Objective C: Communicating
Objective D: Applying Mathematics in Real-Life Contexts
(IB Middle Years Programme, 2019).

These objectives align with assessment criteria, some of which are unique to IB schools. For example, while criterion A assessments may look like a conventional test composed of questions ranging from simple to complex, criterion B investigations often involve students being given abstract contexts where they are required to identify patterns, pose, and test conjectures. While various curricula may require students to communicate their processes by showing calculations, as in criterion C, this criterion also assesses a student's ability to select an appropriate form of representation (a diagram, table, formula, or graph) depending on the context of the problem, and to construct it accurately. Furthermore, while there is an element of project-based learning in other mathematics classrooms (Kokotsaki, Menzies and Wiggins, 2016), the application of mathematics in authentic settings is a regularly assessed component of the framework. In addition, students are required to critique their processes and solutions. In short, the priorities of the framework have core differences when compared to other curricula (Sizmur and Cunningham, 2012).

1.2 Research problem

My study seeks to address a critical gap in the existing literature by focusing on the transition into the IB MYP Mathematics framework. Existing studies have highlighted the general decline in academic attainment in mathematics

during the primary to secondary transition, but there is a dearth of global research. This suggests that the current literature fails to fully capture the diversity often found in international schools, alternative approaches to education, and broader measures of mathematics attainment. This means that the narratives surrounding transition are limited and not inclusive of all children.

1.3 Research aims and objectives

The overarching aim, even beyond this study, is for schools to effectively support students during the transition into MYP Mathematics, regardless of their previous educational context and cultural background. However, as there is no existing literature in this field, the aim of this individual study is to begin the exploration of these transition experiences, to provide recommendations for teaching practice, and areas for further research.

The specific objectives are, firstly, to better understand the first-hand experiences of students. The second objective is to identify the influential factors for these constructions. This includes considering the unique backgrounds and contexts of the students to see if, and how, they influence their perception. This is to help clarify if there are certain students who are more likely to need support or if there is an element within the transition process that could make the experience a more positive one. The final objective is to provide tangible insights and practical recommendations for teachers to effectively support students during this period of adjustment. For this, I want to utilise the IB framework and the elements available to educators already, with guidance for implementation.

The study is set in the context of an international school in Hong Kong, exploring the stories of 15 students to support these objectives. Due to the findings of the study hopefully being of benefit to the year 7 mathematics teachers, the focus is on post-transition, that is the experiences of the students once they are already in secondary school. The overarching aim, objectives and boundaries lead to the final research questions:

1. How do students construct their transition into MYP Mathematics?
2. What factors affect how the transition is experienced?
3. How can the MYP Mathematics Framework be implemented to support students post-transition?

1.4 Significance and contribution of study

The high premium placed on mathematical achievement upon completion of school (Hodgen et al., 2010; Koedel and Tyhurst, 2012) adds weight to the significance of this study. Due to the relationship between a successful transition and a successful outcome (West, Sweeting and Young, 2008) the transition into secondary school mathematics similarly holds value. While there is a large body of research into the primary to secondary transition experience, even with a focus on mathematics (Kaur, McLoughlin, & Grimes, 2022), researchers have acknowledged a gap: further study is needed to consider the perspectives of schools beyond the scope of the UK.

As the entire scope of international perspectives is far too broad to encapsulate in one study, the context of an international school that uses an international curriculum framework and is based outside of the UK begins to address this gap from its unique perspective.

Consequently, this study makes original contributions to knowledge in the following ways. Firstly, it addresses the lack of international perspectives within transition studies focused on primary into secondary mathematics. Furthermore, it introduces and establishes a foundational knowledge base within the specific context of the IB MYP, an under-researched curriculum framework. Practically, for MYP Mathematics teachers, the study offers insights for how they can adapt their classroom environment to support incoming students. This, in turn, has the potential to improve the academic journey of students. The emphasis on student voice has both practical and theoretical advantages. It not only empowers students to identify themselves

as agents of change but also adds a valuable dimension to educational research methodologies, enriching discussions on how best to elicit and empower student perspectives in shaping educational practices and policies. Overall, this study has the potential to benefit stakeholders at multiple levels of the schooling experience.

1.5 Limitations of study

While this study represents a crucial step towards understanding the transition experiences of students into the IB MYP Mathematics framework, it is important to acknowledge several limitations inherent in its design. Firstly, the contextual constraints of the study, an international school in Hong Kong, limit the ability to generalise the findings. The majority of the school population is from Hong Kong, China, or the UK, so the unique cultural issues specific to this context may not be representative of other international schools, with a different make up of student populations, and different cultural priorities. Additionally, the flexibility in how the MYP framework can be implemented across different schools means that these students' experiences and responses to teaching practices may not be fully transferable to other settings. Moreover, the study's focus on post-transition experiences may overlook valuable insights into how primary schools prepare students for transition, potentially contradicting recommendations in that field. Finally, by prioritising student voice, the perspectives of other key stakeholders in education, such as school leaders, teachers, and parents, are limited, which may lead to recommendations for successful transitions that do not align with the values of all relevant parties. Despite these limitations, this study intends to offer valuable insights which can inform future research. By providing contextual descriptions and thorough analysis, the hope is that the research can be in some ways replicated, and recommendations implemented, with appropriate adaptations for the intended context.

1.6 Structure

In this chapter, I have provided an overview of the context and purpose of the research, outlined the aim, objectives, and research questions, as well as discussed the potential contributions and limitations. Chapter 2 will discuss relevant transition literature and provide more insight into the MYP. By synthesising current theoretical and empirical research, this chapter will establish a foundation for my study. Following this, Chapter 3 will present the selected theoretical frameworks and explain how they shaped the research and analysis process. Chapter 4 will then detail the methodology, justifying the choices made for data generation and analysis. Subsequently, Chapter 5 will present, analyse, and discuss the results, setting the scene for detailed responses to the research questions in Chapter 6. Here I will clarify the original contribution to knowledge, limitations will be addressed, and there will be suggestions for future research.

Chapter 2 - Educational Transitions: Existing Knowledge and Emerging Questions

2.0 Introduction

It is beneficial to keep in mind that the choice to explore the transition of primary students into the Middle Years Programme (MYP) mathematics classroom was because, to the best of my knowledge, there was no existing research into this. Nevertheless, many researchers have contributed to a better understanding of this phenomenon by exploring related aims in similar contexts. Through this, they have laid some significant groundwork for this study.

Therefore, the purpose of this chapter is to establish what is already known, and what is being discussed within relevant fields, so that there is an established starting point for this study. Equally important is to identify what has not yet been explored so that it is clear what gap can be addressed through this research. Given the lack of direct literature in this area, this chapter will look at the intersection of specific elements towards the aim, such as student voice, the primary-to-secondary transition, learning mathematics, and the MYP framework.

The chapter will consist of three parts, each corresponding to one research question. Firstly, the research question will be defined and its scope clarified. The most prominent literature relevant to these areas will be presented and analysed. After addressing each research question in this way, the chapter will conclude by discussing the implications of what is and is not present in the literature, thereby highlighting how this study can contribute to the academic discourse.

2.1 How do students construct their transition into MYP Mathematics?

This first research question aims to investigate which key concepts emerge in the construction of the transition experience. It seeks to explore what students choose to share with a broad view as to how these elements are perceived. Further perspectives will be analysed in response to the second research question. As no literature exists detailing explicitly how primary students

construct their personal experience when transitioning into the MYP Mathematics classroom, smaller elements of this will be explored to start building an understanding of what this experience might look like from their perspective. In total, four different intersections will be explored towards this research question, within the existing literature:

1. Student voice in the primary to secondary school transition experience.
2. Mathematics and the primary to secondary transition.
3. Primary to secondary transition in the MYP.
4. Student experiences in an international mathematics classroom.

2.1.1 Student voice in the primary to secondary transition experience

There is significant evidence of declines in academic motivation and achievement during early adolescence and high school, often coinciding with the transition into middle school (Jindal-Snape et al., 2023). These declines manifest in various ways, including decreased school grades, diminishing interest in school, reduced intrinsic motivation, negative self-perceptions, an evolving sense of belonging, increases in test anxiety, a focus on performance over mastery, and increased rates of truancy and school dropout (Evans, Borriello and Field, 2018). Within the primary to secondary transition, a review by Topping (2011) found that teacher and student priorities towards the transition often varied in literature, with teachers mainly being focused on academic changes while students were focused more on their social-emotional wellbeing. The significance of this is that research capturing only the perspectives of teachers, parents or administration cannot be assured to be reflective of the students, which is why the priority within this section is to focus on studies using student voice.

In some cases, students' constructions involved comparing their new environment with their primary school, focusing on a range of areas (Eskelä-Haapanen, Vasalampi and Lerkkanen, 2020). This included the change in their physical environment as well as their routine before and after the transition. Students expressed that the school building itself, as well as the student population, was larger which led to concerns about getting lost while navigating

between classes for each lesson (Waters, Lester, and Cross, 2014). Despite the feeling of enormity, students acknowledged a growing sense of community in comparison to primary school. Mumford and Birchwood (2020) speculated that this may be due to the shared experience of the transition connecting these students who intentionally formed strong relationships as they sought a sense of belonging. An additional change that students focused on was that they no longer had a single class teacher but now had multiple teachers covering a broader range of subjects than before (Spernes, 2020). With this came different approaches to teaching and behaviour management meaning that students were experiencing a much more diverse day than they had in primary school.

The move from primary to secondary school also comes with the position of changing from being the oldest in the school to the youngest. Within literature, students expressed how they were aware that everyone was bigger than them (Doerr, 2020), and the general feeling of being in an unfamiliar environment made them feel even more vulnerable, especially in reference to potential bullying. Despite this feeling of being in a subordinate position, students felt that they were treated in a contradictory way. Being in secondary school and associated with teenagers and pre-teens rather than young children resulted in teachers treating them, in their perspective, like adults even though the students themselves were very much aware of their child status. They felt an increased responsibility to manage themselves, in contrast to primary school, which could sometimes feel like too large a step. Therefore, there was a need to balance this developing independence and autonomy with support and nurturing (Visser et al., 2023).

A prevalent theme alluded to in previous paragraphs was that of relationships. These spanned friendships, relationships with teachers and family. Students identified that when peers were able to support them practically, emotionally, and academically, the transition period was better (Bharara, 2019). While students anticipated a loss of close relationships with peers and teachers, the view was not always negative, with students also identifying that a larger setting provided greater opportunities for new relationships to form (Doerr, 2020). Friendships, both existing and new, also supported maintaining a sense of

belonging and strengthened identities (Isakson and Jarvis, 1999). However, while a sense of belonging was valued and students acknowledged that this gave them a feeling of acceptance, there were also pressures tied to this in terms of image and status, as they grappled with their own self-identity during the critical period of adolescence (Topping, 2011).

The teacher-student dynamics were responded to in differing ways, with some identifying that having multiple teachers gave them more of an opportunity to find someone they connected with, while others did not feel seen. In general, students felt that primary school teachers were more approachable and available (Bagnall, Skipper and Fox, 2020). This aligned with Bru et al. (2010) who shared how teachers of younger children are more likely to be perceived as caring, while teachers of older students were found to have a more formal approach, viewing their role primarily as an educator delivering content. During a period where students are already vulnerable and experiencing the loss of a single class teacher, this teacher disconnect can add to the feeling of being lost, emotionally and physically (Spernes, 2020).

Responses to familial contributions related to both parental effects and sibling relationships. Having older siblings in the same school supported students with the practical aspects of the transition as they had a point of contact for any questions and a perceived protection against threats such as bullying (van Rens et al., 2017). This was sometimes framed as the continuity of relationships as a protective factor. At the same time, students described feeling less comfortable communicating with their parents in comparison with primary school, they were more willing to seek support from older siblings or peers (Bagnall, Skipper and Fox, 2020).

Students also shared the emotions that they felt pre- and post-transition. Sometimes shared was a sense of excitement as they looked forward to secondary school, partly due to the opportunities they believed would be afforded to them - a new beginning (Doerr, 2020). After the transition, there were additional positive emotions of relief when friendships and positive relationships were formed. However, students maintained that emotions were

mixed throughout the process (Hodgkin et al., 2013) and often identified some negative ones. These included feelings of loss; a loss of self-identity, friendships, primary school family, and familiar support (Ashton, 2008). In addition, they noted feelings of anxiety, stress and worry in anticipation of the transition. There was some discussion about the management of these emotions, with some children preferring just to ignore the negative feelings, or wanting their parents to hide their negative feelings to avoid projecting (Bagnall, Skipper and Fox, 2020). Some students recognised that talking about their worries was a positive coping strategy, while others wanted explicit support from teachers and peers to help manage their emotions (Bagnall, Skipper and Fox, 2020).

When looking ahead to secondary school, students expected it to be a different educational environment with greater challenges and opportunities (Doerr, 2020). While this undoubtedly caused some to feel anxious, some looked forward to the opportunity to experience new things and feel grown up. Even the predicted academic challenges were sometimes seen as worthwhile due to the opportunity to learn new things. However, challenge did not result in enjoyment for everyone, with some researchers (Visser et al., 2023) suggesting this was more likely to be the case for higher-achieving students. For others, the challenge, the step up, was too much too soon. This was not only in regards to academic pressures but also the expectations that they had on them as secondary school students.

While some were not motivated by challenge, Visser et al. (2023) found that students' enjoyment of the learning environment was dependent on a range of factors. For some, non-routine activities such as extracurricular events or the development of skills that were not subject-specific were enjoyable. Conversely, repetitive tasks, including repeated content, could reduce motivation to learn.

2.1.2 Mathematics and the primary-to-secondary transition

The literature consistently highlights the negative effects of the primary-to-secondary transition on various aspects of mathematics education (Kaur, McLoughlin, and Grimes, 2022), including academic attainment, motivation, and

students' engagement in inquiry-based learning. Deieso and Fraser (2018) validate this perspective, suggesting that the shift from primary to secondary education often disrupts the mathematical progress and engagement of students. Furthermore, Ryan, Fitzmaurice, and O'Donoghue (2021) provide empirical evidence supporting this claim, as their quantitative findings demonstrate a statistically significant decline in the mathematical proficiency of students between the end of year 6 and the end of year 7. This can also sometimes mean a regression in academic achievement during the critical transition period.

Moreover, Carmichael (2015) contributes to this discourse by emphasising that this decline in mathematical attainment specifically occurs during the transition from primary to secondary schooling rather than in transfers between primary schools. This observation suggests that there are unique factors inherent to the primary-to-secondary transition that contribute to the decline in mathematical performance and engagement. These factors could include changes in curriculum structure, pedagogical approaches, or social dynamics within the classroom environment. Prendergast et al. (2019) emphasise that for teachers on either side of the transition, their belief was that the key contributing factors were the lack of communication between schools and a lack of continuity between curricula. However, it is critical to consider this finding in context, namely that this feedback was shared shortly after a curriculum reform, likely adding to the disruption.

The perceived negative impact of the primary-to-secondary transition extends beyond academic attainment to encompass students' motivation and engagement in mathematical inquiry (Paul, 2014). As students navigate the complexities of transitioning to a new educational setting, they may experience decreased motivation and confidence in their mathematical abilities. The shift from the familiar and supportive environment of primary school to the larger, more impersonal setting of secondary school can be overwhelming for many students, leading to disengagement and decreased participation in inquiry-based learning activities.

The lack of curriculum continuity between primary and secondary education is thought to contribute significantly to the negative impact of the transition on mathematical progression. Secondary school teachers often adopt a "fresh start" approach (Cantley et al., 2020), assuming that students have not covered certain topics in primary school or have not grasped them sufficiently. This approach can lead to repetition of content, as secondary teachers revisit concepts that students may have already encountered in primary school. Some students perceived this repetition as tedious and unstimulating (Skilling, Bobis, & Martin, 2021). Howard & Johnson (2004) noted this led to disengagement among students whose primary teachers had intentionally prepared them academically for secondary school, as they felt that they were not being challenged sufficiently. However, those who were unprepared instead received a shock within the overwhelm of expectations, and it was this that had negative implications for their transition. The solution for this seemingly lose-lose scenario may be found by considering that the students who were taught general learning skills, rather than taught nothing or taught with a focus on content, were better prepared.

Some students viewed repetition positively, recognising that it often occurs at a slightly more challenging level and can reinforce their understanding of foundational concepts, according to Attard (2012). In addition, Nicolescu and Petrescu (2015) explained the complexity of continuity within the topic of fractions by highlighting the different concepts required to fully understand this macro concept. In addition, processes are taught in different ways and in different orders. This suggests that in some way repetition is unavoidable and the stance of a fresh start is understandable.

In addition to curriculum changes, there are often pedagogical discontinuities between primary and secondary education. In primary school, mathematics education often emphasises hands-on, activity-based learning approaches that encourage exploration and discovery (Kaur, McLoughlin, & Grimes, 2022). In contrast, secondary school mathematics tends to place greater emphasis on abstract reasoning and problem-solving, often minimising the hands-on and exploratory aspects of learning. This shift in pedagogical approach can be

challenging for students who expect more active and interactive learning experiences, finding the act of physical engagement more fun. Consequently, many students may struggle to adapt to the more passive and theoretical nature of secondary mathematics instruction, leading to decreased enjoyment and motivation in the subject. Another perspective on these pedagogical discontinuities is the perceived changes from drill and memorisation to those of attempting to attain understanding as students shift to having a specialist teacher (Mudaly and Sukhdeo, 2015). In this case, it is perhaps evident why there may be a repetition of content as referred to in the curriculum discontinuity context. A specialist mathematics teacher may want the students to enrich the foundation of concepts that may have only been simplistically encountered in primary school. Furthermore, this reference to rote procedures in primary school contradicts the exploratory nature expressed previously, which highlights the fact that not all primary settings are the same, and therefore students transitioning into the same secondary school experience will have different points of comparison.

The anticipated change was often viewed as a challenge, and the response to it varied in the literature. In one case, year 6 students' responses to the anticipated challenge was a reduced confidence in mathematics (Matiti, 2020). These apprehensions were later identified as unfounded as the worries dissipated once in year 7. With Carmichael (2015) reflecting that expectations and concerns sometimes influenced reality, it was shared that false fears were something to be avoided pre-transition, as this could ruin an otherwise positive experience. In this case, aligned expectations may have been established through clearer insights into the secondary classroom.

The experience with assessments varied, with students enjoying assessments that were more practical and hands-on, rather than in a traditional test format (Deieso and Fraser, 2018). This seemed to be partly due to the desire for variety with students not enjoying repetitive work, neither paper-based nor on the computer, but instead finding more enjoyment when provided with an environment to be active learners.

This section has shown that many of the key themes occurring in the general transition literature also applied to mathematics-specific contexts. This provides some reassurance that, to some extent, the findings can be transferable and offer some understanding of the minimally explored main topic. This is of increasing importance as closely related literature becomes rarer in later sections. In particular, there is a decreasing amount of student voice. However, in the same way that general transition information informed the transition into mathematics, I believe that value from other stakeholders can contribute, with the awareness that there will be some differing priorities, to understanding students' experiences.

2.1.3 Transitioning into the MYP

There is a significant lack of research into this area. In fact, only one study in the last decade was found regarding this primary into MYP transition, and it had a focus on the transition to MYP science (Buniel and Ravichandran, 2018). This section will present the relevant findings from this study after first highlighting what the IB has to say about the transition.

There are, theoretically, many similarities across the programmes. Certain IB elements such as approaches to learning and teaching, international mindedness, the learner profile, and a focus on service are all within the core of the model. Although the programmes form a continuum, the IB recognises significant pedagogical differences that influence a student's learning across the PYP (Primary Years Programme) and MYP phases. One such difference is a move from transdisciplinary learning (where the learning integrates subjects) to disciplinary (where subjects have clear boundaries) and interdisciplinary learning (knowledge from multiple subjects are brought together). The IB is clear that teachers have a responsibility to facilitate this transition process but limit their suggestions to stating that schools need to differentiate so that teaching is appropriate for the range of needs of students and to consider curriculum design (International Baccalaureate Organization, 2014). The flexibility of the IB and therefore the seemingly minimal guidelines will be discussed later in the chapter; however, at this point it is enough to note that there will certainly be a shift between the stages.

Buniel and Ravichandran's (2018) study into the transition of primary students into MYP science had several interesting findings. When considering differences pre- and post-transition, they referenced pedagogical discontinuities from PYP to MYP. They noted that students moved from inquiry-based to a more concept-based and in-depth content-based learning environment. It was noted that these differences between PYP and MYP resulted in challenges experienced by students and teachers. Some of these challenges were due to a lack of subject specific-skills which may have been due to primary school teachers lacking the scientific skills and understanding.

Beyond this specific study, general comparisons of the PYP and MYP are shared by Walker and Lee (2018) and the gaps between the academic demands and different pedagogical approaches are highlighted. Furthermore, assessment looks different in each programme with even teachers in the MYP sometimes struggling to understand their own assessment criteria and certainly teachers in either section of the continuum not really knowing what teaching, learning or assessment looks like in the other programme. This affects the extent to which a primary teacher could prepare a student for transition. In addition, even if there was some insight, different terminologies across the programs contribute to further disconnection.

When assessing related literature, any reference to a transition into the MYP was often only discussed as from the PYP. What was less considered was that students may not have experienced the PYP; they may have attended a non-international school more reflective of local practices or in an alternative country of origin. One study by Dickson, Perry, and Ledger (2020) suggested that year 7 students from an Australian primary curriculum were even less prepared for the MYP than those from a PYP background.

2.1.4 Mathematics in international settings

Considering the context of the study and the origin of international schooling, it felt necessary to supplement the lack of MYP Mathematics research with studies in other international classrooms. Rather than exploring how

mathematics is taught in different countries, the priority was to consider the complexities of having a transient and diverse classroom with students from different backgrounds.

On the one hand, many potential benefits can be identified. The presence of a range of backgrounds, languages and cultures is an opportunity to look at mathematical methods and mathematicians outside the usual Eurocentric space (Corlu, 2013). In addition, Buntsma (2023) identified that differing languages were not necessarily a barrier as teachers were willing to let students use their home language to support their own learning or the learning of their peers. From students' perspectives, some students perceived international school teachers as being more relaxed and easier to build a relationship with (Corlu and Alapala, 2015) particularly in comparison to the stricter lecturers seen in some students' native countries. Further comparisons showed that the style of problem solving seen in these classrooms could be more enjoyable with a greater focus on real life as opposed to algorithmic drills. Additionally, due to international schools often catering to affluent families who were able to invest financially in their child's education, a by-product of that was found to be parents who were, in some ways, more able to support their child with their studies, either directly or by hiring a tutor.

Conversely, there are some potential practical issues to consider as well. While not necessarily negative, the different vocabulary and notation used in mathematics across different cultures would be seen in students' processes. For example, the use of math versus maths, the phrasing used to define a fraction (e.g., referring to the numerator or denominator first) and the order in which percentages are written (Corlu and Alapala, 2015). All these differences, and more, exist before even addressing the way different methods of problem solving are taught in different places. While this could be used as a valuable teaching point in reference to international and open-mindedness, there would likely be some incidences of miscommunication and misunderstanding between peers and to or from the teacher.

Another consideration was the culture, or cultures seen in a classroom. An international school can be quite a transient space, with people potentially joining and leaving throughout the school year. Due to this nature, building a classroom culture can be a challenge (Corlu, 2013). In addition to this, the lack of a shared first language could also make it difficult to meet that aim. Furthermore, despite teachers stating that other languages were welcome to be used in the classroom, Buntsma (2023) found that this was not actively encouraged and therefore not seen as a means of support.

In addition, Walker and Lee (2018) pointed out the possibility of a cultural disconnection; an example was with Asian parents, some of which had different priorities than the school's pedagogical approaches, instead being focused on examination-oriented outcomes. Particularly within the MYP, the learning observed did not always exemplify the expected rigour of the DP. Furthermore, some students experienced dissonance between their educational beliefs and the practices and the beliefs of their teacher, ultimately feeling pressured to adopt the understanding shared with them rather than their own (Corlu and Alapala, 2015).

2.2 What factors affect how the transition is experienced?

This research question has a dual focus. Firstly, the consideration is to examine the pre-existing attributes of a child which may influence how they construct their transition experience. The second focus which is to consider what strategies schools, and specifically classroom teachers, have done to support these students in transition. Within this there will also be lines of discussion about what constitutes a successful transition, acknowledging the existence of multiple perspectives on this matter.

2.2.1 What pre-existing characteristics or internal factors affect transition?

Depending on the composition of the school, certain attributes within the student population may be more prominent than in other schools (Chambers and Coffey, 2018). However, it is important to note that just because these groups of students are prominent does not necessarily mean that the associated characteristic lends itself to being a risk or protective factor. This

section will evaluate some of these elements which have been researched in the transition context previously.

One consideration are the students who may be considered vulnerable due to factors impacting their social and emotional development. This includes students with neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD) and autism spectrum disorder (ASD). Some research suggested that these students may have additional struggles in the transition due to the traits often associated with the conditions (Zendarski et al., 2016) including discomfort with change and the difficulties experienced during social interactions (Richter, Popa-Roch, and Clément, 2019). Similarly, students with poor prior behaviour had been reported to have unsuccessful transitions (Anderson et al., 2000). Research suggested that children with emotional needs and behavioural difficulties may find the process challenging as they transition from a primary school environment that prioritises differentiation for different needs to a seemingly less child-centered environment, which may class their differences as deficits (Dixon and Gahir, 2005).

Similarly, when considering another vulnerable group, one study looked at the experiences and needs of children in care, also referred to as “looked after” (Brewin and Statham, 2011). In this study, around half of teachers and carers acknowledged that these children struggled with the social aspect of the transition. From the child’s perspective, the focus was more on the fear of being bullied, which caused a significant amount of anxiety. However, students outside of this category also reported feelings of fear and anxiety. This suggests that, to some extent, fears are not necessarily attributable to status and therefore need to be addressed across a cohort.

This same point about relative challenge can also be seen in Doerr’s (2020) study exploring whether students from small, rural schools experienced the transition any differently than those from other primary schools. While students from the rural schools did mention the perception of secondary school being much bigger and therefore addressed concerns over the organisational and practical aspects of transition, so did students from other primary schools.

Secondary schools are typically larger than primary schools regardless of the context, so the response to this may be a shared experience and the relative differences less significant. A benefit that was raised by the students from rural primary schools was that, because of their smaller context, they were more likely to know students from the older years in their new secondary school if they had also gone to their primary school. These sorts of relationships were less likely to form in larger primary schools where friendships stayed within classes and year levels.

This benefit of relationships was prevalent throughout transition literature (Anderson et al., 2000; Bharara, 2019; Doerr, 2020; Rodrigues et al., 2018; Visser et al., 2023). Looking further at relationships with students in older year groups, having an older sibling in the school has been recognised as a protective factor against associated negative experiences with transition. This benefit is multi-faceted. Firstly, they provided insight about the next environment, making the unknown known to the incoming child. The familiarisation of the physical environment and knowing what to expect in regards to routines met the need for safety which led to a less fearful experience. In addition, this ready-made social connection also started to build the feeling of belonging which runs as a common thread amongst transition literature. This sense of community and belonging can also be developed by other people in the child's environment - peers, teachers, and parents.

Having supportive friends, either pre-existing peers from a common primary school or quickly making friends in the new setting, not only contributed to the sense of belonging but was also found to have a positive impact on academic achievement across the transition period (Bharara, 2019).

Parental involvement and access to responsive teachers were seen to have similar effects on academic and emotional wellbeing, meaning that those with access to these older connections had additional support through their transition. This can be seen in a study by Rodrigues et al., (2018) where students from a migrant background, who may ordinarily have been considered vulnerable, expressed holding more weight in the opinions of their parents and

teachers than their own choices through their transition. Conversely, a lack of familial support could result in students being more vulnerable to negative impacts. For example, several studies found that students from low socio-economic households were more likely to develop at a slower rate across the transition with regards to their mathematics development (Bharara, 2019; Carmichael, 2015). However, Anderson et al. (2000) suggest that this is likely due to the lack of parental support structures in the home.

Another demographic factor researched in literature is gender, and particularly the impact of this significant environmental transition taking place on the cusp of adolescence, as biological transitions were also occurring with regards to puberty. While some studies looked at the social and emotional needs of boys during this time (Mowat, 2019) as girls were more likely to be entering secondary school as puberty-related changes take place, this made them particularly vulnerable to negative effects (Saville et al., 2023) as they were more vulnerable to the environmental and biological elements (Anderson et al., 2000). Academically, both boys and girls were found to have a decline in attitude toward inquiry and enjoyment (Deieso and Fraser, 2018) but this was more extreme for boys. With Bharara (2019) also saying that boys are impacted more negatively academically and Carmichael (2015) claiming that gender is related to mathematical development, regardless of transition, it is challenging to reach a consensus about the relationship between gender and a successful transition.

On the academic aspect of transition, there is evidence to show that a student's prior attainment in primary school may affect how they respond to the learning environment during the transition. On one end of the scale, students with prior low academic achievement are likely to significantly struggle with the transition because they are not academically prepared for the next school level (Anderson et al., 2000) and this suggests that high grades would be a protective factor towards the transition. However, studies of some of the higher-achieving students, sometimes labelled as gifted or talented, suggest that the transition is not necessarily smooth for them despite this perceived academic preparedness. This is in part due to the lack of communication between schools, meaning that

their prior progress is not shared, leading to curriculum discontinuity (Harries and Tennant, 2012).

Elaborating on these viewpoints, Skilling, Bobis, and Martin (2021) suggest that a student's attainment and the intersection with their level of engagement are a more accurate indicator of their construction of their transition into secondary mathematics. Their study looked at students categorised as having high or low ability (HA and LA) as well as classified as engaged (E) and disengaged (D). While there was a wide range of responses even within the subgroups, there were some key, relevant perspectives that emerged. For students who were engaged in their learning, this engagement was closely tied to traits such as intrinsic motivation and the belief that effort directly influenced achievement, regardless of their current level of attainment. These students embodied what Carol Dweck (2006) defines as a growth mindset—the belief that abilities can be developed through dedication and hard work. Because they saw challenges as opportunities to learn and improve, they were more likely to respond positively to difficult tasks. These students actively sought help when needed, persisted through setbacks, and took ownership of their learning by revising their work and distancing themselves from distractions. Their efforts and strategies were aligned with the goal of personal growth and progress, demonstrating a proactive approach to overcoming obstacles.

In contrast, disengaged students often exhibited traits of a fixed mindset—the belief that their abilities are static and that success is a reflection of their inherent qualities. They saw the need to prove their competence rather than improve it, and they interpreted setbacks as failures rather than learning opportunities. Even high-achieving students with this mindset tended to lose confidence as they transitioned to secondary school. When they encountered difficult concepts that they couldn't grasp immediately, they often believed they had "lost" their abilities, further reinforcing their fixed mindset and disengagement from learning. For those classified as LAD, a negative self-identity as a mathematics learner could be seen with a preference to collaborate with peers over asking a teacher for help. These diverse perspectives could be seen in circumstances such as revisiting concepts from primary school. While

HAD students were quickly bored from repetition, a HAE student took the opportunity to find another approach to the same problem. This highlights how different mindsets toward the same scenario can evoke different responses from students.

This study also highlighted that motivation could be dependent on what the students' goals were in regards to the subject. This could be seen with one of the HAE students noting that they needed mathematics to reach their future career aspirations, while one of the LAD students had no plans to take the subject further. This puts into focus the more personal attributes of a child, beyond any demographics or labels. Aside from their unique goals, students' personalities and mindsets are much harder to categorise as they are so multifaceted. Even more complex is whether these traits are inherent or because of a student's environment, or if they can be developed. Some of these attributes included having resilience, making the most of opportunities and having a positive attitude (Doerr, 2020). Others were framed as coping mechanisms and include independence, industriousness, and conformity to adult standards (Anderson et al., 2000). These traits were sometimes related to spirituality, with students' ability to engage in meaningful reflection and introspection enabling them to better self-regulate academically (Bharara, 2019). This again highlights how a student's mindset can affect their perception of this period.

While some of the factors above indicate that specific factors may be considered risk factors for transition, Mowat (2019) posits that the period of adolescence in general means that students during this transition are vulnerable in regards to issues related to identity, self-esteem, and competence. This suggests that transition support for the few may in fact be helpful for the cohort. However, while the challenges that students experience before, during and after transition may sometimes appear similar, the ways in which students best confront and overcome these challenges are many and varied. For this reason, a 'one size fits all' approach to transition support is unlikely to ensure that the needs of all students can be met (Chambers and Coffey, 2018). Therefore, the interventions shared in the next section, while at times intended for specific

subgroups of students will be considered for the general student population, with the caveat that the way they will be required by each student will be unique.

2.2.2 What role can a school play in supporting this success?

This study will focus primarily on how a classroom teacher can provide support within their direct context post-transition. However, it is worth noting that most literature considers the full transition process and the intricate networks around it. Therefore, recommendations are often directed at pre-transition or guiding administration, primary teachers, or parents. Some of these will be referenced as they can potentially be adapted to be used in the classroom by the teacher or child themselves.

Academic support

The role of teachers

Teachers played a significant role in impacting the academic transition. Particularly when they developed strong pedagogical relationships with students (Paul, 2014) they were able to support them in the way they best learn. Furthermore, a teacher with strong subject knowledge is better equipped to tailor instructional practices and deliver lessons that focus on understanding (Kaur, McLoughlin, and Grimes, 2022) and show the real-life applications of this learning (Mowat, 2019). Students were also found to value teachers who were enthusiastic, as this added to their enjoyment, as well as teachers who gave effective feedback so that students could better assess their progress (Visser et al., 2023).

Providing choice and space for autonomy

Students were seen to value the flexibility to create a meaningful learning experience. This involved students having choice where possible (Chambers and Coffey, 2018). This could be the option to choose from a range of activities, and when there was no choice available, students needed to be clear on the purpose of why they were being asked to do what they were doing. Beyond the activity itself, giving students flexibility in the form they chose to represent their work, as well as the level of engagement required, helped to cater to their

unique learning preferences. This was sometimes linked to peer relationships as they could choose activities conducive to collaboration, while some students preferred to protect themselves from disruptive peers if given the opportunity for flexible seating (Skilling, Bobis, and Martin, 2021).

Transparency in curriculum development

Students appeared to be reassured by a clear path towards academic progression. This partly meant knowing what to expect but also knowing what they could do in order to move forward. Partly for this reason, the discussion on curriculum continuity was significant in transition literature (Cantley et al., 2020) with Evangelou et al., (2008) emphasising that students were able to maintain an interest in schoolwork when they were prepared for the level and style of work, knew what was expected of them and the work involved built upon what was seen in primary school. Similarly, parents appreciated this insight as they were able to cooperate with this aim for continuity by supporting from home (Richter, Popa-Roch, and Clément, 2019) particularly if they were given guidance of what would be studied. This resource supported students who wanted to get a head start on secondary subjects, particularly students who perceived themselves as bright and were more likely to be motivated by the challenge of what was to come (Skilling, Bobis, and Martin, 2021).

Developing positive mindset strategies

This was a continuation of the role a positive mindset had as a coping mechanism but with the indication that some of these habits could be developed and nurtured. Supporting students in working in areas where they found enjoyment or on things where they showed strengths was shown to have a positive impact (Doerr, 2020), as was supporting them in being more organised and focused. In addition, mindset interventions focusing on persistence and belonging were shown to have positive effects on academic outcomes for different groups of students (Beatson et al., 2023).

Practical support

This section focuses on what schools can do to reduce secondary school's perceived gap and relative enormity.

Transparency of a typical day

Generally, students wanted to know what to expect physically when joining the school. This included being familiar with the school environment and knowing older students and some staff, such as their future teachers, ahead of time (Visser et al., 2023). A more detailed insight was expected to be obtained through a transition event or taster day, which some students indicated they would like more of. However, Ashton (2008) warns that these days are often not reflective of the true post-transition experience with expectations not meeting reality and potentially leading to disappointment when school begins. However, Waters, Lester, and Cross (2014) indicate that this may not be the case with a positive taster day, reflective or not, making it more likely that a student experiences a positive transition.

Transparency of challenges

Students may feel that their primary schools have not been honest about the challenges that might arise (Visser et al., 2023) which means that, post-transition, students are suddenly faced with high expectations to cope with a sudden influx of requirements that did not always appear consistent or fair (Mumford and Birchwood, 2020). Students felt this was a big step up resulting in a lot of pressure. The recommendation to counteract this is two-fold. Firstly, an explicit communication of these changes and then, after the fact, support to handle these changes and challenges (Visser et al., 2023).

Tangible tools

Perhaps an extension of the former two points, students wanted more than just information, they wanted to equip themselves with practical strategies and resources to support their transition. While timely and clear information was essential (Richter et al., 2019) students wanted to physically experience transport arrangements, receive tools that supported their understanding of the layout, and receive planners to support organisation (Doerr, 2020). Ultimately, this supported them in developing the independence they would need to thrive in secondary school over a longer-term period (Visser et al., 2023).

Emotional support

While the points above would organically have an influence on a student's emotional wellbeing, there were some elements that specifically addressed this.

Building a sense of belonging

A connection to peers and teachers was seen to build a strong sense of belonging at school (Hassard, Pendergast and Hay, 2024) which had the ability to act as a protective factor at a time when children are dealing with issues related to identity, self-esteem, competence, and social support (Mowat, 2019). Social-emotional wellbeing during transition was often connected with developing relationships, connecting with the community, and creating a positive school environment (Holt et al., 2022). A focus was therefore on where schools could support the development of these and seize opportunities for relationship building (Mumford and Birchwood, 2020). This included before the transition, giving students opportunities to meet peers and teachers (Visser et al., 2023) or even other older students (Doerr, 2020). Then, providing space for these connections to flourish and evolve into a support network enables this to be an effective safety net.

Demystify fears

"Value lies in bringing the largely imagined world of the secondary school into the `known' experience of the Year 6 child…to contest some of the fears and fantasies" (Lucey and Reay, 2000, p.202).

This links to the previous points about transparency, but specifically addresses the emotional implications related to fears of the unknown. This is less about familiarity or feeling like there is too much to handle and more to do with addressing the potential anxiety linked to not knowing what to expect. Therefore, the more measures that can be put in place to mitigate this, essentially ensuring students know about the environment they are moving into, the more their anxiety can be reduced (Chambers and Coffey, 2018).

A safe space

Bringing the two previous points together, having relationships that allow for fears to be addressed and resolved can feel like a safe space. Particularly at a time when students are facing the mixed feelings associated with growing up. On the one hand, they are excited for the freedom and autonomy from adult regulation that the move to secondary school brings, but they feel a slight loss of protection as they move away from that regulation (Lucey and Reay, 2000). Students instead want an adult that can offer that sense of security, giving space to discuss any anxieties and receiving practical advice, such as ways to avoid being bullied (Doerr, 2020). One apprehension about parents being that safe space was the possibility that their parents may project their fear surrounding the transition and this would amplify the pre-existing anxieties within the students (Visser et al., 2023).

2.3 How can the Middle Years Programme (MYP) Mathematics framework be implemented to support first year students?

The International Baccalaureate (IB) framework has various tools and systems that can be mobilised to support students during the period of transition. The focus of this question is to utilise what is already theoretically available within the framework to support the needs of students, rather than identify further external considerations. Therefore, this section will present some relevant components of the IB programmes, most of which are applicable across the PYP and MYP and could, consequently, support continuity.

2.3.1 Unique elements of the IB framework

Learner profile and international mindedness

The IB presents ten attributes, the learner profile, which it desires its learners to aim for. These are inquirers, knowledgeable, thinkers, communicators, principled, open-minded, caring, risk-takers, balanced, and reflective. They believe that these are the attributes of internationally minded people who are equipped and empowered to pursue beyond personal growth and instead benefit their wider community to help develop a more peaceful world (International Baccalaureate Organization, 2014).

Global contexts

Global contexts are used to help situate learning in authentic real-world scenarios, encouraging international-mindedness and global engagement. These global contexts are:

- Identities and relationships
- Orientation in space and time
- Personal and cultural expression
- Scientific and technical innovation
- Globalisation and sustainability
- Fairness and development

(International Baccalaureate Organization, 2014)

Interdisciplinary

Interdisciplinary teaching and learning is integrative, bringing together elements of two or more subject groups to develop new understandings, and purposeful with the aim of addressing authentic issues (IB Middle Years Programme, 2019).

Approaches to learning (ATL)

These skills (table 2.1) span across the programmes with the intention of helping students “learn to learn”. They support lifelong learning across academic spaces and can be learned, improved, and taught. (International Baccalaureate Organization, 2014).

ATL skill categories	**MYP ATL skill clusters**
Communication	Communication
Social	Collaboration
Self-management	Organisation, Affective, Reflective
Research	Information literacy, Media literacy
Thinking	Critical thinking, Creative thinking, Transfer

Table 2.1 Approaches to Learning skills

Approaches to teaching

Teaching in IB programmes is:

> • inquiry-based—provoking curiosity in order to structure and sustain exploration
> • concept-driven—planning and teaching through concepts that are transferable to new contexts
> • contextualized—reaching beyond the scope of individual subjects to establish relevance
> • collaborative—promoting effective teamwork and purposeful/productive collaboration
> • differentiated—providing access to learning for a diversity of learners
> • informed by assessment—balancing assessment of, and for, learning.
>
> (International Baccalaureate Organization, 2014, p.73).

Service as action

Service experiences may help students gain an appreciation of their role and responsibility in bettering the world around them and improving the lives of those in their community. In the MYP, students are expected to interact locally, addressing and planning to meet a need in the community (International Baccalaureate Organization, 2014).

Holistic

An IB education is holistic in nature; it is concerned with the whole person and therefore addresses students' social, emotional, and physical well-being. The MYP offers a broad and balanced framework and encourages curriculums to be designed to incorporate co-curricular activities that reflect a holistic view of school values and mission. Assessment criteria are also described as holistic, offering qualitative value statements about student achievement (International Baccalaureate Organization, 2014).

While these elements are explicit in the IB framework, it is important to recognise that many of them are recognised and valued components in general teaching practice. While some schools still adopt a teacher-centred approach within mathematics instruction (Noyes, 2012) pivots are being seen;

authoritative recommendations are often towards an education which is student-centred and purposeful (Pampaka et al., 2022), and curricula are being developed based on contextual learning contributing to the local and global community of the students (Garrett and Nelkon, 2024). The significance of this is that the recommendations, strengths, and limitations shared in the next section can still be of value for non-IB, but similarly student-focused, schools.

2.3.2 Strengths and weaknesses of these elements in literature

The above descriptions are offered directly from the IB and therefore only offer an intention of what teaching and learning may look like for students after the transition into MYP. The following section examines these elements within literature and considers how they exist in actual educational spaces. This section will look first at the strengths of the elements, then at the weaknesses discussed in empirical findings.

Strengths

As the MYP is flexible, schools can adapt it to meet their needs. This room for creativity can result in an environment with holistic teaching and assessment (Bunnell, 2011), generally, a fun curriculum that engages students (Perry, Ledger, and Dickson, 2018).

The MYP's holistic philosophy has the potential to develop both academic as well as non-scholastic skills. Teaching approaches and expectations for students can result in students having more opportunities to take ownership of their own learning (Hutchings Jr, 2010). The focus on student inquiry, concept-driven, and interdisciplinary learning supports an academically rigorous and high-quality learning framework (Perry, Ledger, and Dickson, 2018). Furthermore, the development of skills such as critical thinking, open-mindedness and empathy can lead to a more authentic international mindedness as opposed to merely the superficial effect of having a diverse student population (Elerian, Papanastasiou and Solomou, 2024).

Beyond developing environments conducive to international mindedness (Jurasaite-O'Keefe, 2022), the MYP promotes other opportunities to connect

beyond oneself with the promotion of service to the local community (Perry, Ledger, and Dickson, 2018), and interdisciplinary links across subject areas (Dickson, 2019).

Weaknesses

One common criticism was that many of the IB elements were theoretical, essentially IB schools may “talk the talk” but not “walk the walk”. For example, the outward-facing elements of international mindedness, service as action, and global contexts were referred to as aspirational and artificial terms that might only exist in documentation (Cochrane, 2017). This was further validated by teachers who shared that they felt able to discuss international mindedness, but not implement it in their practice (Martyna Elerian, Papanastasiou and Solomou, 2024). Furthermore, for those who tried to implement it, more problems arose. Even if they were in an almost mono-cultural classroom, there existed the presence of western bias in the curriculum, or even the teacher’s worldview. As a result engagements in global issues could be tokenistic or superficial (Jurasaite-O’Keefe, 2022). Even student-focused developments such as the ATL skills and learner profile attributes were viewed by some teachers as only being incorporated in unit plans as a check box task (Dickson, 2019).

Another issue was the perceived lack of transparency among teachers, which had implications for students. This included jargon that is not clearly defined (Cochrane, 2017), time consuming rubrics (Bunnell, 2011), and a lack of clear exemplars or curriculum material as guidance (Perry, Ledger, and Dickson, 2018). The latter is a negative repercussion of flexible curricula differing from school to school, thereby perhaps not lending itself to examples.

The clientele of international schools and the high cost of being an IB school (Perry, Ledger, and Dickson, 2018) can lead to a perception that they are elitist (Bunnell, 2015). This bubble that students exist in, being in schools within some of the world’s strongest economies or in pockets of privilege in countries with weaker economies (Cochrane, 2017), could promote a skewed perspective as students consider what international-mindedness and service look like. A further consideration based on the student population are the priorities of the parents,

which in turn could sway the focus of the school. Depending on the location, the choice of an IB school for many was due to their prioritising the Western-oriented path towards higher education, employment, and global mobility and less about the IB aims of holistic development (Martyna Elerian, Papanastasiou and Solomou, 2024).

Despite this, a final criticism is the lack of rigour of the MYP, in terms of content and assessment, in comparison to the DP. Specifically, the alignment between the two programmes is critiqued, which brings into question the credibility of the whole continuum (Bunnell, 2011). In one study (Corlu, 2014) findings tentatively showed that the IGCSE was a better preparatory curriculum for the DP than the MYP, partially because of the compulsory external assessment as opposed to the MYP's optional one.

2.4 Summary

2.4.1 What the research does and doesn't say - the gap

This chapter has looked at the current research surrounding the primary to secondary transition, both generally and specifically within mathematics. Where available, student voice was promoted to focus on their construction of it. In addition, elements related to transitioning into the MYP, both from the PYP as well as other primary frameworks, were considered. To better address the context of the study, the unique elements often present in an international classroom were discussed. Then both the internal characteristics of a child as well as supportive interventions were analysed to identify which were considered risk or protective factors within literature. Finally, some components of the MYP framework were defined and critiqued to begin understanding how they could be implemented to authentically support the transition.

It was noted that many studies covered pre-transition interventions, with less explicit discussion of what schools and specifically teachers could be doing to support after the transition.

What the research also shows is that there is potentially a misalignment between what is viewed as a successful transition and, to some extent, a successful learning experience. Where academic success has attempted to be tracked and resulted in identifying a lack of progress or indeed academic regression, often it is with quantitative measures (Orhani, 2022) and against content-based skills (Ryan, Fitzmaurice, and O'Donoghue, 2021).

The MYP literature has highlighted that this may not be the priority of all frameworks. In addition, where student voices were heard, students also shared other priorities, such as enjoying themselves and feeling safe. Where voices beyond the IB themselves were heard in the MYP specific sources, the focus was often on parents, teachers, and leadership (Perry, Ledger, and Dickson, 2018). This highlights the gap to evaluate what success may look like in this specific context through student voice. Finally, the limited transition literature in the MYP context is not related to mathematics specifically and largely only looks at the transition from the PYP.

When initially reading the literature surrounding transitions, I found that many references to successful transitions were rarely defined by the child itself. As a teacher and parent, I see the necessity of an adult safeguarding the wellbeing of a child. At the same time, having taught secondary school students for over a decade, I also recognise that these students are often very aware of their own needs, wants and desires. Therefore, reading literature defining transitions as unsuccessful due to metrics dictated by administration, teachers and other stakeholders in education felt incomplete. As highlighted in the literature review, even where student input was seen, it was often in response to questions created by the researcher, and therefore students were only responding to what was presented to them, not what they chose to contribute.

This motivated a focus on student voice, positioning students as "critics and creators of educational practice" (Cook-Sather, 2019, p. 182) by first appreciating that they offer unique and valuable perspectives on educational experiences (Nelson, 2015). Practically this meant involving students as researchers (Fielding and Bragg, 2003), enabling them to explore areas they

found meaningful in an environment where their perspectives were both heard and valued. These considerations, along with my commitment to embrace and empower student voices rather than merely capturing them, shaped the choices made within my methodology and theoretical framework.

2.4.2 Final research questions and scope

1. How do students construct their transition into MYP Mathematics?

This question seeks to find out what elements of the transition students choose to share and what common perspectives exist.

2. What factors affect how the transition is experienced?

This question aims to develop the findings from the first question to further analyse variety in how and why these elements are shared. This will include how the attributes of the child or the environment affect whether the element is shared positively or negatively.

3. How can the MYP Mathematics framework be implemented to support students post-transition?

This final question aims to use the tools within the framework to support the elements students valued.

To summarise, the focus of each question is to find out what is shared, who is sharing it in a certain way and why, and how we can use this information to support a more positive experience in this specific context.

Chapter 3 - Key Concepts and Theoretical Perspectives

3.0 Introduction

The review of literature in the previous chapter provided both context and validation towards the aim of exploring the experiences of students when transitioning into the Middle Years Programme (MYP) Mathematics course. In addition, a theoretical framework needed to be developed to support the research process. The diagram below (figure 3.1) outlines how the two selected frameworks interacted with the study, particularly when classifying and analysing findings.

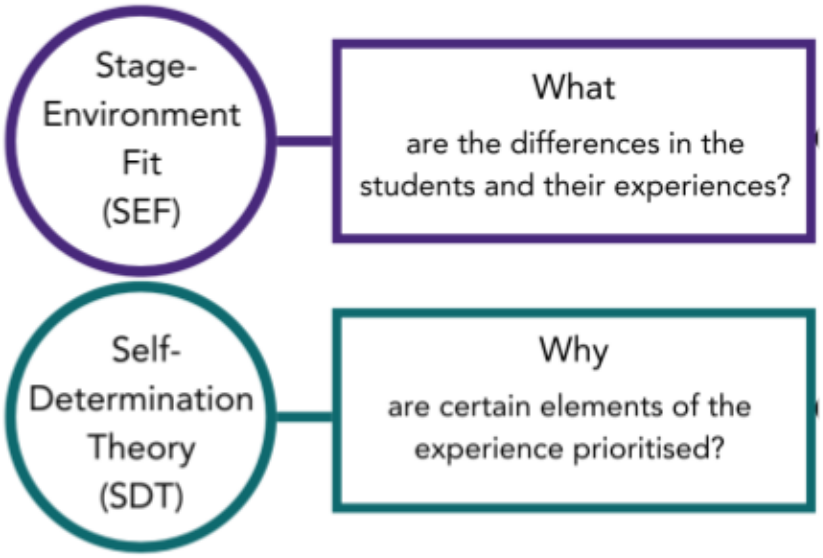

Figure 3.1 Theoretical frameworks

This chapter will explain the relationship between each framework and the primary-to-secondary transition experience, before making a case for a dual lens.

3.1 The concept of transition: Stage-Environment Fit (SEF) theory

The purpose of selecting a transition framework was to support in identifying what students chose to voice about their primary-to-secondary transition experience. It was therefore logical to select a framework that provided language surrounding school transitions or transitions relevant to this age group.

A recent overview (Jindal-Snape et al., 2021) of transition frameworks within the context of primary-to-secondary transitions supported in comparing and evaluating which would be best suited for this study. As my research questions and aim were primarily focused on what students were transitioning into, secondary school, and only one aspect of that, mathematics, it did not seem practical to select a framework that was longitudinal or too multidimensional in nature.

While acknowledging this supported me in selecting a relevant model, I remained aware that I was excluding other frameworks due to my position as a secondary mathematics teacher. This added opportunities for further reflection at the analysis stage. Specifically, the appreciation that any elements elicited from the constructions of the students were not the full picture.

Initially this reduced scope led to the evaluation of Person-Environment Fit (PEF) theory, which suggests that when a person's needs align with the opportunities and demands of their environment, positive outcomes such as increased well-being and success are likely (Pasca, 2014). Conversely, when there is a misalignment, negative effects may be more apparent. While other school-related transition frameworks provided language to discuss educational structures, it felt unlikely that students would be familiar with terms such as 'pedagogy' or 'administration', so I could see limitations with these frameworks in supporting student voice. Whereas the language associated with PEF was around expressing needs and feelings towards environmental elements; this seemed more likely to correspond with the language shared by students and was aligned with the aim.

However, as the multidimensional frameworks suggested, the school transition experience does not occur in isolation and instead there should be a consideration towards any other significant life changes when planning for support or intervention (Jindal-Snape, 2018). The awareness that this transition occurred around the period of adolescence led to this being

considered as a significant life change, one which might affect what students chose to express. This was partly because the ability to vocalise wants and needs advances during this period (Dahl et al., 2018). This led to the selection of Stage-Environment Fit (SEF) theory with a recognition of it as an extension to Person-Environment Fit theory.

During the transition from primary-to-secondary school, SEF recognises that students are entering a more complex environment with changes in structure, social dynamics, and instructional demands. At the same time, they are also experiencing significant physical, cognitive, and emotional changes as they grow into adolescents (Eccles & Roeser, 2009). This theory helps to explain why some students may struggle during the transition if the new school environment fails to meet their developmental needs.

One relevant characteristic here is that early adolescence brings cognitive changes as well as the development of the self-system: self-concept, self-esteem, and identity development (Wigfield, Lutz and Wagner, 2005). The interplay between these developmental shifts and the demands of a more complex school environment can create a misalignment. Therefore, understanding this dual transition, and the needs associated with it, is necessary.

One essential need is the provision of a safe space for students to navigate these changes, and an environment to demonstrate their growing desire for autonomy, increased self-consciousness, and shifting peer orientations (Symonds and Hargreaves, 2014). Aldridge, Blackstock, and McLure (2024) further emphasise the importance of this safe environment by highlighting not only the necessity of emotional and physical safety but also the critical roles of community support, quality learning experiences, and institutional values.

Eccles and Roeser (2009) used the framework to evaluate the interaction of schools with the developmental needs of the students at multiple levels. In these discussions, the relevant key concepts considered in these discussions were teacher beliefs and classroom climate. The findings showed that

students in this developmental phase had optimal stimulation and development when they were in an environment with a balance between holistic support and room for autonomy, as well as diverse and challenging tasks. This shows the importance of balancing academic, social and emotional factors when considering how to create an ideal environment.

Symonds and Hargreaves (2014) studied the emotional and motivational judgements drawn by adolescent students, and school “giving them what they need” was cited as the main rationale for engagement. They also valued school as a place to spend time with friends, students who had recently transitioned, while also acknowledging the increased social status that came with being friends with older students. In addition to this, a variety of learning experiences and the autonomy of choosing working groups also appealed to these students. Shifting from environment to stage, students noted being, or feeling, more grown up in comparison to pre-transition students, largely in response to the higher demand and challenge in the new environment.

In terms of contributions to a negative environment, one key factor was a lack of positive relationships with teachers. Some students saw teachers as disciplinarians, while others felt like their autonomy was removed, and others still felt like their teachers did not try to build a relationship with them. While students enjoyed practical subjects, they disengaged with theoretical lessons. Again, speaking to the increased challenge, some students felt overwhelmed by the organisational elements and academic demands of secondary school.

Further studies have used this framework to evaluate the extent to which the secondary school mathematics classroom fits the newly transitioned student. While the contexts are distinct, the findings provided some indication of what to potentially look for from the students’ contributions. Athanasiou and Philippou (2008) evaluated the difference between the actual and preferred classroom environment before and after the transition. Several discrepancies were found: they found that students wanted more participation and interaction with their teacher, but at the same time more independence; this

was the same both pre- and post-transition. Even further disparities were found in the secondary school setting. Here, students also felt that they did not have enough opportunities to investigate in their learning environment, which insinuated a structured learning experience with little autonomy. However, they also felt that there was too much differentiation offered by teachers. This instead implied that there was too much choice. Students desired a balance between direction and autonomy, flexibility, and support. Booth and Gerard's (2012) inclusion of the 'honeymoon effect' accounts for the impression that students initially perceive the new environment positively, but later become more aware of tensions and mismatches. This shows that a framework doesn't necessarily make it easy to reach conclusions, but it at least offers a focus for which concepts to analyse.

This framework will be utilised to organise the findings and construct key themes. This framework highlights that there may be a friction between the students' perceived new identities and what they need from the school. Furthermore, it alerts that the discontinuity often seen in schools could be parallel or misaligned with the rate of pre-pubescent development. Ultimately, it provides a reference for the language of students surrounding change, whether it be towards their environment or themselves.

3.2 The concept of values: Self-Determination Theory (SDT)

While the Stage-Environment Fit (SEF) theory supports the identification of factors where students may identify a (mis)fit, there was a need to also have a lens through which to understand why the (mis)alignment occurred. Furthermore, with SEF having a focus on early adolescence, there was a need to acknowledge that the changes associated with this life stage occur at different points for various children, with girls generally experiencing puberty 18 months ahead of boys and, even within gender, some enter puberty later while others have early maturity (Wigfield, Lutz and Wagner, 2005). This means that the needs attributed to adolescence may not be applicable to all students at the time of transition. This brings the necessity to zoom out to what needs may be relevant for other stages of life.

This led to the consideration of Self-Determination Theory (SDT). SDT focuses on understanding human motivation and well-being by exploring the conditions that foster or hinder personal growth. While it comprises of several mini-theories (Ryan & Deci, 2017) the foci of each differs across different aspects of motivation. The one most relevant to the aims of the study is basic psychological needs theory. This is because it offered a broader lens to consider psychological conditions and well-being as opposed to narrower goals or specific motivations. It is therefore this mini-theory that will be referred to when discussing SDT throughout the study.

Central to this lens are three basic psychological needs: autonomy, competence, and relatedness. Autonomy refers to the need to feel in control of one's own actions and decisions, competence can be defined as feeling capable and effective in one's activities, and relatedness concerns the need for meaningful connections with others. According to SDT, when these needs are met, individuals are more likely to thrive and experience higher levels of motivation, development, and well-being.

The theory also provides insight into how different environments influence motivation. Specifically, it helps identify which factors within a given context support or undermine these basic needs, thereby enhancing or diminishing motivation and personal growth.

This framework was partially selected due to its connections to Stage-Environment Fit. For example, the component of autonomy runs through both theories. Both theories highlight the significance of creating environments and structures that support individuals' abilities to lead fulfilling lives based on their own values, interests, and unique needs. In fact, Stage-Environment Fit drew upon ideas from Self-Determination Theory in its conception (Eccles and Roeser, 2009).

However, this framework considers other needs that relate to my wider context and aim and, therefore, has the potential to explain values presented

beyond the desire for autonomy. With the focus of the study being on a learning environment, being aware of students' academic competence in this new setting is certainly relevant. Then, with literature consistently highlighting the importance of relationships, it seems crucial to recognise and prioritise relatedness as an influential factor.

3.3 A dual lens

Combining both theories gives a focus on providing an environment which meets the needs of adolescent students at the point of transition, and at their stage in their mathematics journey.

Other studies have used both frameworks in similar contexts and addressed the tension between the needs the student may have and what is supported by the new environment. For example, Schweder and Raufelder (2024) found that teacher-directed instruction within secondary schools can fail to address the core needs because it assumes knowledge from the teacher being passed to the student, in essence devaluing the student's competence. The same delivery to all students removes decision making and self-management or autonomy. Furthermore, the setting is not conducive to developing teacher-student relationships and may develop a competitive rather than collaborative environment. In comparison, they found that students transitioning to a student-directed learning environment resulted in an increase in intrinsic and identified motivation. They indicated that a student-directed learning environment was more capable of meeting the fluctuating needs of adolescents.

Wang (2012) chose to use both theories to explore longitudinally the outcomes of students from year 7 to year 10. The teacher's effect on the environment was identified as critical, particularly their expectations, support, teaching, and promotion of cooperation.

3.4 Summary

This chapter has presented two frameworks that will be utilised to analyse generated data. Stage-Environment Fit theory will be used to identify potential tensions between what students express they value, being attentive towards the priorities associated with adolescence as highlighted in the literature, and what the school environment offers. Meanwhile, Self-Determination Theory will be used to better understand why students choose to share specific aspects by comparing, as far as possible, against the basic needs of competence, relatedness, and autonomy.

Chapter 4 - Methodology

4.0 Introduction

This chapter will detail the process designed to answer the research questions. It begins by explaining how a combination of the gaps in literature, as well as my own ontological and epistemological perspectives, helped to select specific research methodologies. The tools chosen to address the research aim are detailed, as is the analysis process. The context of the research is described, to make clear the boundaries of the study. Due to the context and nature of the research, the relevant ethical considerations are discussed. Finally, potential limitations of the research design are highlighted to better understand to what extent any conclusions reached from the results can be generalised.

4.1 The "why?" behind the research design

One aim of this study was to identify how teachers could best support the transitions of students into the Middle Years Programme (MYP) mathematics course. However, due to the limited existing research in this area, the initial focus was shifted to first exploring the experiences of these students.

The previous chapters showed that relevant literature often projected a view that the primary to secondary transition has a negative effect on students' progress in mathematics. However, this study is motivated by the premise that perhaps this conclusion is premature, utilising limited indicators and a narrow range of viewpoints.

Bringing both my perspective on research and the gaps in the current research together, my motivation for the research design can better be summarised. The design is based on the belief that the transition is experienced differently by different students and that, to discover what is different, how, and why, an approach needs to be taken that acknowledges that there is not a collective voice in this transition. A single classroom holds multiple cultures, genders, family backgrounds, languages, personalities,

economic situations, learning needs, ambitions, and social-emotional status. The list goes on. Yet, every individual, where possible, takes part in the routine move when transitioning from primary school to secondary school with expected success to some degree. The reality is that these diverse factors will affect how they experience the transition and whether they define it as successful. I believe the research approach should facilitate the generation of these stories for the sake of identifying and removing potential barriers to student-defined success.

Stebbins (2001) says that to effectively explore a phenomenon, one must approach the situation with flexibility and open-mindedness. Therefore, an exploratory case study was designed, guided by the considerations offered by Hamilton and Corbett-Whittier (2013). Key components were that it was an instrumental case study bounded by a single event, transition, and conducted in a single institution. It focused on generating rich empirical data using multiple tools and from multiple sources. It utilised my role as a teacher-researcher as I was positioned within the research environment and generated data across a relatively short (10 months) period. A case study provides focus rather than narrowing it, and it supports the case scenario to be examined in depth. While a single case cannot be generalised to the population of all cases, the examination can support naturalistic generalisation, where readers can identify similarities in cases and transfer understanding (Stake, 2009).

To support students in sharing their experience in their own voice, narrative inquiry was utilised within the case study. While scholars have reached varying understandings when defining narrative inquiry (Wells, 2011), a common theme is the understanding that stories are powerful. Some definitions are literal with the word story, and suggest that a narrative involves retelling a series of events to convey meaning leading to an end point. However, other definitions are broader, and include conversations, reports, interview transcripts and even visual communication in the form of video or a series of photos. All of these re-present events or experiences through some form of communication.

Biggeri (2007) identified a limitation of allowing children to define what is valuable: the potential misalignment between what is expressed and what is experienced. The environment of the child could lead them to adapt their true desires and values leading to untrue expressed perceptions. Therefore, I also sought to provide context to this narrative with the aim of co-revealing knowledge, including potential obstacles perhaps not identified by students. This perspective initiated the generation of additional data from the position of a class teacher, aiming to compliment rather than overpower the case studies built on student narrative inquiry. A timeline of data generation is shown in figure 4.1. The reasons behind the choice of the tools are discussed later in this chapter.

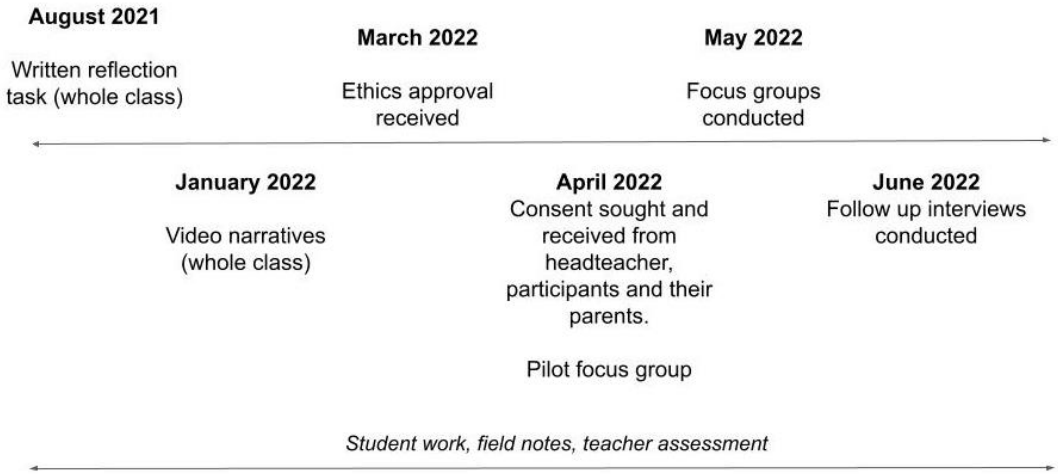

Figure 4.1: timeline of data generation

4.2 Context of research

The context of the study was an international school in Hong Kong. As an International Baccalaureate (IB) continuum school, some of the students transitioning into secondary school there had completed their last year of primary on the same school campus. Of the remaining, some had studied the same curriculum in a different school, and others had studied the local Hong Kong curriculum, with a small number studying a different curriculum such as US, English, Australian, or other international. While the school had specific language requirements upon entry, students had a range of language

proficiencies. An overview of how these characteristics presented themselves in the year 7 cohort is shown in Figure 4.2.

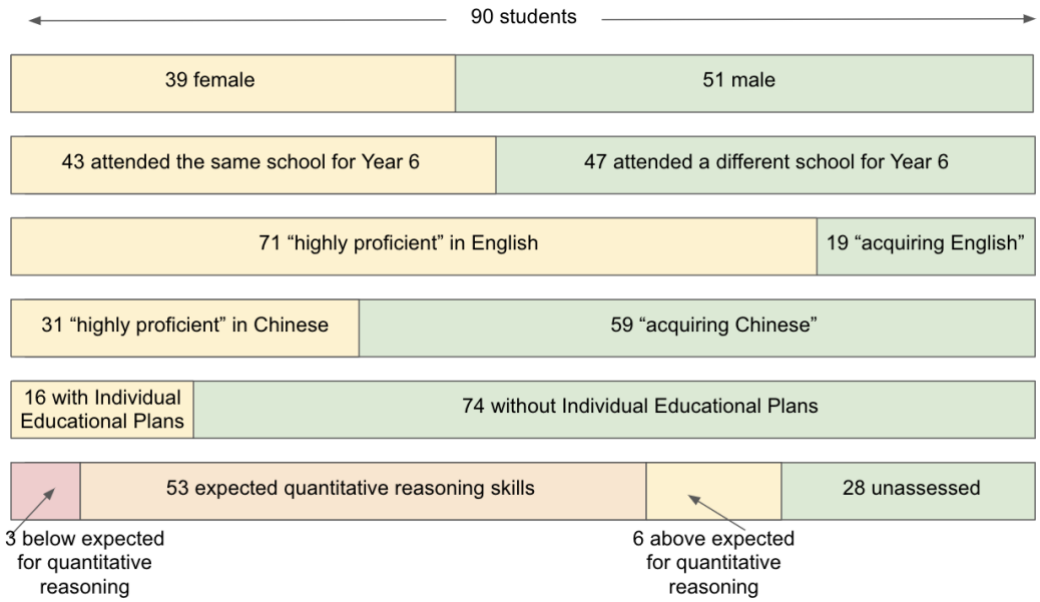

Figure 4.2 Year 7 profile in case study school

When deciding which population to take the case study sample from, there were four year 7 classes to choose from. As a teacher of two of them, I had to reflect on whether selecting the students I taught would be beneficial for the study or a hindrance. On the one hand, students may be less open and honest in front of their teacher, as they may worry about the impact on their studies. Alternatively, as we already had a relationship beyond the researcher-participant dynamic, they may be more comfortable sharing. Furthermore, with the other two classes being taught by newly qualified teachers who had not been trained in IB schools, there was concern that their pupils would not experience a true transition into the MYP, as these teachers were getting accustomed to it themselves. In addition, while, as head of department, I would have access to observe the other classes and the work produced, there would inevitably have been greater opportunities to note key incidences amongst my own students throughout the year, and smaller details would be more easily recognised. As a result, I decided to select a sample of students from my two classes and make every effort to eliminate potential conflicts of interest as ethically as possible. These ethical considerations will be detailed later in the chapter.

Of these 48 students, 40 of them were present throughout the year. Some students joined later in the year and others left before the final term. A sample size of 12 was decided upon for the case studies. This number came from a desire to balance in-depth insights with significant enough participation for the focus group sessions to be conducted. Taking into consideration the profile of students in this smaller population, a random stratified sample was taken by grouping students into different categories (table 4.1), numbering them in their groups, and using a random number generator to select an appropriate proportion of students from each stratum. The focused indicators were primary school context, proficiency in English and gender. The secondary factors of having individual educational plans (IEP) due to learning needs, quantitative reasoning scores, and Chinese acquisition classifications were considered for balance, but not strict conditions for strata.

Primary school attended	**English proficiency**	**Gender**	**Sample**
Case study school 23 students	22 proficient	12 male 10 female	5 male (all proficient) 4 female (all proficient)
	1 acquiring	1 male	
Other PYP (Primary Years Programme) 5 students	4 proficient	3 female 1 male	2 female (both proficient)
	1 acquiring	1 female	
Local curriculum 10 students	3 proficient	2 male 1 female	3 male (2 acquiring, 1 proficient) 1 female (acquiring)
	7 acquiring	5 male 2 female	
Other curriculum 2 students	2 proficient	2 male	1 student - male (did not respond)

Table 4.1 Number of pupils in sample categories

It is recommended to over-recruit to compensate for non-attendance, with a guide of at least 20% above the required value being quoted (Fern, 2001). While 16 students were invited to join the study, one did not respond. Rather than excluding three willing participants, the remaining 15 students were all included in the case study, and their profiles are shown below (table 4.2).

Key:

A = acquiring	F = female	N = no O = other (PYP international school)
B = below	H = high	P = proficient
C = case study school	L = local school	U = unassessed
E = expected	M = male	Y = yes

Name	Primary school context	Gender	English proficiency	Chinese proficiency	Quantitative reasoning	IEP
Aria	O	F	P	A	U	N
Benjamin	L	M	A	P	U	N
Caleb	C	M	P	A	E	N
Darcie	C	F	P	A	E	N
Elliot	C	M	P	A	E	N
Freya	C	F	P	A	H	N
Grayson	L	M	A	A	U	N
Harper	C	F	P	A	E	N
Isla	L	F	A	P	U	N
Jasmine	C	F	P	A	E	N
Kai	C	M	P	A	E	N
Lewis	C	M	P	A	B	Y
Mason	L	M	A	P	U	N
Noah	C	M	P	A	H	N
Olivia	O	F	P	P	E	N

Table 4.2 Student profiles

4.3 Narrative inquiry

Narrative inquiry is a methodology that has the purpose of inquiring into an experience holistically and should therefore start with an open-ended exploration that allows individuals to share their stories. This largely inductive approach occurs prior to relevant themes being confirmed, as initial concepts and theories should largely emerge from what is shared at this stage. The purpose was to explore what students value or prioritise when considering a successful first year in secondary education. However, there is an element of negotiation and co-composition of narratives, which highlights the role of the researcher in unpacking the participants' experiences. This negotiation was present at multiple stages during the implementation of three methods to gather students' oral narratives.

Narrative video/audio recordings

This research method aimed to identify how students described their own transition. With regular reflection being an essential element within the MYP, this task was carried out by all my students, after their first term of secondary school. However, only the perspectives of the sampled students were considered within this study. Students were asked to record their thoughts about "the move from primary to secondary maths - particularly **what you think about MYP Mathematics**?" The guidance was to record for up to 10 minutes, by video or audio, so students could speak however they felt most comfortable. Students were reassured that there was no incorrect response; they could share whatever felt important or was prominent in their minds.

Despite the good intentions regarding the openness of this request, students quickly responded to the task asking for further guidance and clarification. Tsai (2007) writes about how, while younger children tend to want to use their story-telling skills, and are often willing to sharing their experiences openly, teacher involvement in the formative school years (interrupting or reacting negatively) sometimes leads to older students restricting what they want to naturally say. This can develop to the point where they merely respond to direction and cues in their narratives. While this was unfortunate

and misaligned with what I had initially hoped to hear, my focus was not to initiate the unlearning process of this practice; instead, I had to adapt to it. A list of prompts (Appendix F) was therefore compiled to offer some direction.

Focus groups

Choosing to carry out focus groups stemmed from the reasoning that narratives can be enhanced when relating to others; the prompting or curiosity of others, or hearing their introduction of certain facts may encourage an individual to divulge further when sharing an experience (Daiute, 2014). In contexts where participants are unpacking a shared experience, focus groups allow participants to co-construct and collaboratively produce a shared opinion (Jung and Ro, 2019). However, it was important to remain aware that any views from a focus group are very much context-dependent and responsive to the group dynamic. This therefore differed greatly from the type of narrative that was expected from the video recordings, and the potential diversity was welcomed.

Considering the logistics of the focus group included researching ideal size, duration, and the dynamics between participants. An initial guidance of between six and ten participants was provided (Hennink, 2007) as this allows the group to be small enough for everyone to have an opportunity to share insights and large enough for diversity of viewpoints. However, smaller groups than this are identified as being advantageous when participants have significant insight into the research topic or when the purpose is to identify detailed experiences. A potential disadvantage of smaller groups is the limited range of issues that arise, which could prevent insight about the population norms being gleaned. In addition, it can be harder for participants to sustain a discussion with a smaller sample, which may place more pressure on the individuals participating. To combat these barriers, more facilitator involvement is required to sustain discussion, and multiple focus groups can be run to gather a wider range of views. The first four focus groups will provide the majority (70 - 80%) of new information surrounding an unfamiliar topic. After this point, data collection reaches saturation and there comes a point of diminishing returns (Fern, 2001).

Prior to the focus groups taking place, it was identified that physical focus groups would most likely not be feasible due to the COVID-19 restrictions placed by the education bureau. Further research was conducted to understand how this should impact the design of the group and how it could affect the outcomes.

Woodyatt, Finneran and Stephenson (2016) found that in-person focus groups involved the sharing of longer responses however, their responses were less likely to be relevant to the discussion topic, and participants were more likely to interrupt one another. Online participants spoke less but offered succinct and directly relevant responses providing more immediate clarity. The role of the moderator was influential in both settings and had the potential to mitigate certain disadvantages. For the online setting, the role of the moderator could focus on prompting further contributions and encouraging discussions to continue. However, probing was found to be more difficult online because non-verbal and visual cues were more challenging to pick up on. The key finding that offered reassurance was that, despite the level of contributions through each forum, both platforms produced similar themes, which implied that the setting did not largely affect the data.

Four focus groups were carried out, using different combinations of three to four students. Segmenting the study population into sub-groups can encourage effective discussion due to homogeneity and enable comparison of responses between the sub-groups (Fern, 2001). One involved only students who had studied the local Hong Kong curriculum, and another involved students who had only studied the IB PYP (Primary Years Programme) curriculum in the case study school. The other two involved a combination of students from these subsets as well as a student who had studied the IB PYP at a different school. The reasoning behind this was to identify if the same level of consensus or diverse opinions were drawn from the different makeups of the groups.

Each focus group lasted between 45 minutes and 1 hour and was conducted on Google Meet, as this was the platform that the school had approved for

teacher-student interactions. All sessions were recorded in accordance with the school policy, capturing voices, faces, on-screen activity, and any comments made using the chat feature. All of these were transcribed prior to analysis.

The structure of the focus group was based around three activities that aimed to develop the initial ideas that had been shared in the narrative recordings. Activity-oriented questions allow for extra thinking time and are particularly beneficial for children who may be more engaged with an active experience than a series of questions. This engagement is essential when the aim is to promote discussion and elicit answers (Colucci, 2007). Activity one was a collaborative ranking task where students were asked to order the four MYP mathematics objectives from best to worst. This was purposefully left ambiguous, as I wanted to see if best was interpreted as easiest, most enjoyable, most useful, or otherwise. As it was conducted online, students were given access to a shared, interactive, digital document where the four objectives were written on individual cards and a scale was shown on the side (figure 4.3).

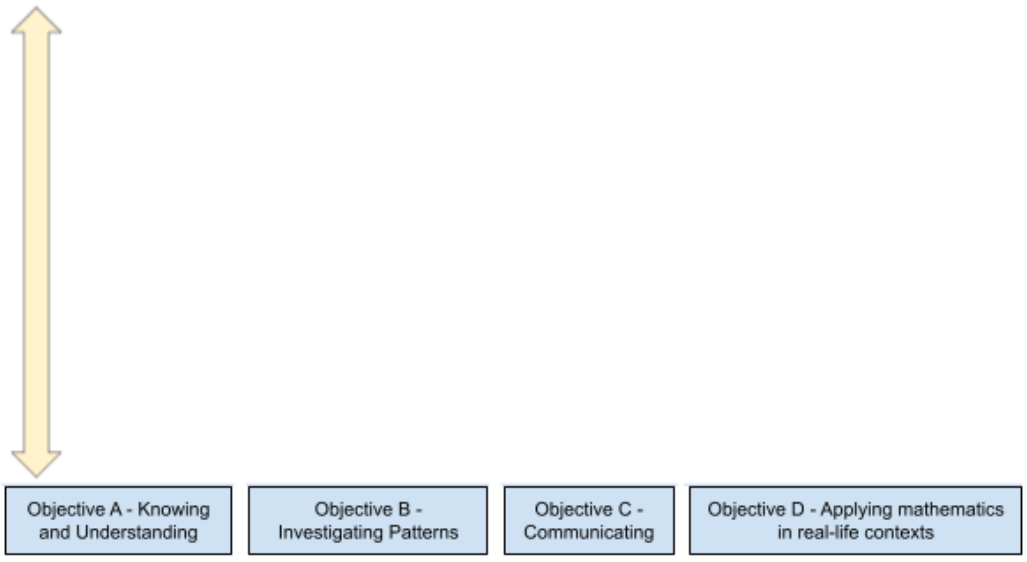

Figure 4.3 Ranking activity for focus groups

They each had the freedom to move the cards independently but were encouraged to reach a consensus before finalising positions. This task was included because the objectives are a key feature of the course, but students rarely referred to them in their initial recordings. While I wanted to hear what they chose to share without too much prompting, I felt that this activity was broad enough to generate authentic themes or at least add to what had already been provided.

Activity two was more explicitly based on the narrative recordings. Four direct or paraphrased quotes were taken from the recordings and shown on the document. Students then utilised a visible thinking routine, “claim-support-question”, to agree with or question the statement, providing evidence with their response. Thinking routines from the Harvard project encourage students to make their thinking visible to themselves as well as others (Gholam, 2018), which in this setting would produce a richer narrative while also allowing students to reflect more on their own transition experience rather than just state it.

Activity three combined two thinking routines, but, despite taking place in a focus group setting, was an independent task. It combined adaptations of “I used to think…now I think” and “Headlines” to encourage students to generate a phrase which summarised their transition experience. The key was to see if any of the conversations had altered their perception from the narrative recording stage, which is why placing it within the focus group setting allowed the discussions to be at the forefront of their minds while they crafted the statements.

Interviews

The purpose of the interview process was to validate and clarify the students' voice that had been delivered through the narrative recordings and the focus groups. The intention of this was to highlight what individuals had chosen to bring to the forefront. The aim was not to draw out new perspectives at this later stage for fear of putting words in their mouth or asking them to comment on something that did not feel significant to them. While I was open to any

new themes emerging, the design focused on asking questions that referenced students' own quotes directly and asked them to confirm their meaning or unpack them further. Lindsay and Schwind (2016, p.15) say the role of the interviewer, or narrative inquirer in this case, is to listen attentively, return to interim texts from transcripts and field notes, paraphrase and ask clarifying questions to learn what the participant has to share. The motive may be to affirm, challenge or extend. The interviews therefore spanned a range of time from 10 minutes to almost half an hour, as some students wanted to volunteer more information while others did not embellish much on what had been said previously.

Student reflection

One additional tool was used to complement the narratives of the students. Early in the academic year, all students were asked to share their current feelings, thoughts and expectations towards the teaching and learning of mathematics. While all students participated, only the responses of the case study students were included in the study. This documentation offered a unique perspective in contrast with the narrative videos, focus groups, and interviews. Firstly, it was the only visual form of narrative. Secondly, all other data was generated near the end of the transition (up to 10 months after starting secondary school) whereas this captured their thoughts prior to experiencing an MYP Mathematics lesson, just a few days after starting secondary school. The format of the task is shown in Figure 4.4.

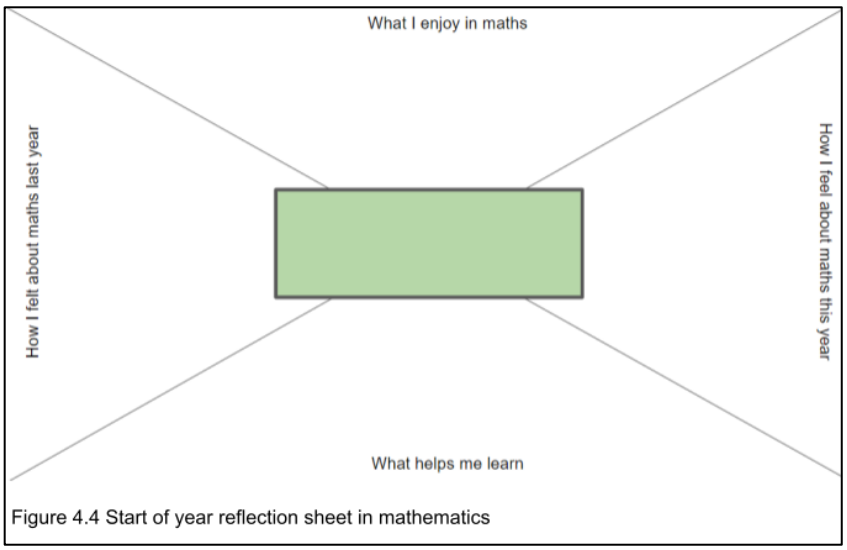

Figure 4.4 Start of year reflection sheet in mathematics

Documents - Teacher Voice

As the priority was to amplify student voice, documents in this category were generated, but included only when needed, to add context. Initially I was interested in comparing whether a student's construction of their transition corresponded to my teacher observation, but I later chose to put this to one side. The field notes were referred to the most during the analysis stage, as they supported me in adding student behaviours and interactions to the narratives and uncover meaning. The student profiles were primarily used to describe attributes of the student that provided context to what they chose to share. Student work or assessment was only referenced for the students whose narratives were looked at in depth, and again this was just to add an additional perspective to support their points made.

4.4 Analysis process

Thematic analysis was selected as the aim of the research was to identify key elements of the transition experience that could potentially result in themes. Other forms of analysis were considered but rejected because of their greater focus on structure (narrative analysis) a risk of becoming quantitative (content analysis) and prioritising interactions (conversation or discourse analysis), all of which did not contribute as much to the aim (Wells, 2011).

An inductive approach was taken to draw out themes driven by student narrative data rather than pre-defining them. The process was conducted using narrative recordings, focus groups, interview responses, and the early reflection piece where students shared their start of year thoughts about mathematics. Keeping a journal was invaluable throughout the process. There were many elements to consider, and writing supported the decision-making process. Keeping my field notes with me during lessons, interviews and at the analysis stages allowed me to cross reference what I was hearing from the students, with what I was seeing with my own eyes. Having these observations also made it easier to critique my positionality, particularly if what I had recorded did not correspond with what the student shared. Braun

and Clarke (2022) offered insight for reflexive analysis in addition to providing the steps for thematic analysis (Braun and Clarke, 2006). This process, and the impact reflexivity had on the journey, will now be outlined.

Phase 1 - familiarisation

All video narratives, interviews and focus group discourse were manually transcribed, which helped with the familiarisation of the data. In addition, the responses in the reflection sheets were catalogued into a spreadsheet to allow for easier classification. This process supported a view across cases, providing a sense of what were already common references within the students' narratives. Following this, I chose to read the data within cases, one student at a time. I chose to do this chronologically, starting with their written reflection, moving on to their recordings, and ending with their focus group contribution and interview. This led to some initial thoughts regarding the experience of students in specific contexts, as well as seeing if and how the narrative evolved over the transition year in focus.

Phase 2 - Generating initial codes

Subsequently, I went through all the data again, attaching a code to sentences or phrases that I noted had a valuable idea. This was initially done at a semantic level, often rephrasing what was shared. Then I reviewed them in a more latent way, addressing the sentences coded in the context of who shared them, what they were in response to, and other data. The codes largely represented transferable ideas, which represented the narrative shared, which meant that several statements from different students occasionally had the same code. This was not done to dilute meaning but to aid with the grouping of perspectives and to form a multidimensional meaning. Examples of this process are shared in the results section of the next chapter.

Phases 3 - 5: Identifying and Defining themes

The journey from codes to themes was in no way linear. Initially, I found that ideas could generally be categorised into the themes of change and staying the same and further separated into positive and negative. However, this led to some challenges as there was some overlap between positive attitudes towards change and negative feelings towards staying the same, as well as resistance to change and positivity towards familiarity.

My next idea was to connect my data with the theoretical transition frameworks, classifying codes as alignment or tension between stage and environment, or identifying the basic need behind the statement. This was beneficial to some extent, as it challenged me to critique codes from multiple angles and this certainly generated further ideas for themes. However, I felt that the process placed too many boundaries on my exploratory study, as some key ideas from the selected frameworks did not feel significantly present in my codes, while some prominent narratives did not seem to belong in any of the categories.

After a period of what I felt to be failed attempts to construct a narrative centred around theory, I began clustering the codes based on the values that were being exhibited through the narratives. Even at this point, the process was not iterative. The initial values still had some overlap, and occasionally a meaningful code was not encapsulated by any of the values in play or seemingly fit into multiple. While reflexivity was a primary consideration throughout, I believe it was at this stage that I was particularly critical of my choices and the potential motives behind them. Acknowledging my position as a teacher and recognising that my vision of an ideal learning journey could differ from that of the students. In practice, this meant not constructing a theme based on codes that I merely found interesting or wanted to explore more, even though it was not an obvious priority for the students. For example, I had somewhat expected learning in a language different from the one spoken at home to be a significant factor in the transition, as I had seen the implications of this on the work students had completed. However, in their reality, apart from a few mentions of using Google Translate, students did not incorporate this as a key part of their story. Honouring each student’s

truth as pure and valid was required to construct the authentic themes they wanted to be heard.

Eventually, reflecting on the purpose of the study and acknowledging the value of the students' narratives, the themes were based on the shared narrative that was told from different perspectives by most of the students. This will be shared in the next chapter.

4.5 Ethics

This research was given ethical approval by the University in the early stages of design; however, ethical considerations were made throughout the study and were driven by the motivation to empower the participants, while also protecting them. These considerations surrounded consent, choice, communication of rights, clarity, credibility, and confidentiality. BERA guidelines (BERA, 2018) were used as a basis, however, due to the study taking place outside of the UK, "good conscience and ethical code" were invaluable indicators as this study was navigated and unexpected scenarios arose. With Hong Kong perhaps living in the aftermath of COVID-19 longer than other countries, navigating between online and physical classrooms throughout the process meant that different ethical considerations were highlighted at different points, such as the storage of recorded online meetings and classes.

During the process for ethical approval, permission to complete the study was sought from the headteacher of the case study school to acknowledge their role as gatekeeper for the students during the school day (appendix A). Participants and their parents were given an information sheet (appendices B and C) to ensure they understood the conditions of the study prior to signing the consent form (appendices D and E). As consent was directed towards the active participants of the study, but this did not cover the entire class, care and consideration had to be taken when making field notes and including them in analysis, particularly when they involved a student or teacher outside of the study. As far as possible, the interaction focused on

the case study students' actions and responses and made it easy to exclude external students from the data.

The element of choice extended from the initial consent across the process. Students could choose, at any point, to withdraw completely or to participate less in the focus group activity. This included a date as a caveat, particularly with the focus group, as it would not be plausible to withdraw one person's contribution after a certain level of analysis.

Students were kept informed of their right to be treated fairly, especially considering the diversity of the group. In addition to this, the teacher-researcher to student relationship was referred to early on and addressed to reassure students that the hierarchical structure that exists in the classroom should not carry through to the research. I felt this was particularly important in Hong Kong where educators are often highly respected by parents and students. It was important to maintain some separation from this thinking to receive as much honest input as possible.

Clarity was a key component. Students were always spoken to or written to using child-friendly language and offered every opportunity to ask further questions if they were unclear. I had to be proactive in detailing the purpose of the study, their role, and how the data would be stored and shared. In an international setting, this was particularly important for students and parents whose first language was not English.

Systems to address confidentiality and anonymity were implemented as far as possible, However, due to the teacher-researcher role, it is possible to infer some details regarding the setting of the study. Regardless, particular care was taken in the generation and storage of data, as well as in the writing up process. Audio and video recordings, and later their transcripts, were stored securely. In the writing-up process, anonymity was offered in the form of pseudonyms. Student profiles aim to not include superfluous details that unnecessarily indicate who a student is.

To prevent coercion during data generation, the voluntary nature of the process was made clear to students, and their parents, both through written and verbal

communication. I felt this needed to be shared explicitly due to the context of the study which had the potential to result in power imbalances. In particular, I ensured that students knew that their participation, or lack thereof, would have no impact on their academic outcomes in terms of report comments or grades. Beyond merely participating, I also wanted students to be active contributors through the data generation. I was aware that some of the participants' comments surrounding secondary school experiences may have directly or indirectly been related to my teaching or our shared classroom experience, and I did not want them to fear being honest. To mitigate this, I emphasised the benefit their openness could have on future Year 7 students, and again reassured that there would be no negative repercussions in regards to my feelings towards or treatment of them.

The effectiveness of these measures was evidenced by the responses of the participants. One invited student opted not to participate in the study at all, and another requested to observe rather than actively engage in their focus group. In addition, the breadth and depth of student contributions indicated that students felt safe sharing both positive and negative aspects of their secondary school experiences. Most students also demonstrated a balance between affirming and extending or rejecting statements during the follow-up interviews, indicating they were comfortable challenging my interpretations and expressing disagreement where necessary. This further demonstrated their autonomy and trust in the process.

4.6 Summary

This chapter shared why certain research approaches were taken into consideration for the research questions. It aimed to be as transparent and coherent as possible to enable similar research to be replicated in a different environment. However, as with any research method, there are limitations. The subjectivity of qualitative data is inevitable but not necessarily negative. My position as a teacher-researcher allows me to add value to the data analysis process. It would be unfortunate to merely play the role of a fact-finder passing on raw data when I have the advantage of knowing these students and understanding the context. As my purpose was to amplify

student voice, reflexivity was essential for checking that my voice and opinions were not overshadowing the narratives students had chosen to share. Further limitations of the research process will be discussed in the conclusion of this study, as inevitably the findings and discussions will highlight further areas to be considered in future studies.

Chapter 5 - From Stories to Synthesis

5.0 Introduction

This study aimed to explore the experiences of students during the period of transition into studying mathematics in the International Baccalaureate (IB) Middle Years Programme (MYP). The focus was on amplifying students' voices to inform teachers' implementations and further support students at this stage. While the existing literature and theoretical frameworks provided some basis for hypotheses, this was an exploratory study and so I was very open to any themes that reflected the narrative the selected students chose to share.

The purpose of this chapter is to present, analyse and discuss the narratives of the students with a focal point around defined themes. These themes are:

- Students expect change
- Students value progression
- Students value comfort
- Students value purposeful and interesting learning experiences
- Students value transparency
- Other people have an impact on the transition.

The chapter will begin by offering insight into the journey, from the voices captured, to codes, and to themes. Then the presentation of results and analysis will begin by presenting the narratives of three individual participants, providing different perspectives on the themes. Selecting specific narratives to highlight proved challenging due to the uniqueness of each story of transition; however, I decided to choose three individuals who candidly shared their experiences, providing valuable insights into the advantages and challenges they encountered along their journey. Moreover, considering that these three students had diverse primary school backgrounds, their viewpoints offer varied perspectives on complete transfer versus partial transition. Subsequently, the chapter moves on to presenting each theme independently, with references across the narratives of all fifteen

participants. This develops into a discussion, with findings synthesised against the literature.

As a teacher-researcher, my dual role provided a unique and invaluable perspective on the classroom dynamics and students' learning processes. My ongoing presence in the classroom allowed me to engage deeply with the nuances of students' behaviours, interactions, and responses. While reflective journal extracts, teacher report comments and the questions asked in the follow-up interviews integrated my teacher voice, they captured only a fraction of the broader, lived experience I had as the class teacher. The daily observations and interactions provided a depth of understanding that went beyond what could be gleaned from isolated moments of data generation. These insights are embedded throughout my analysis, demonstrating a strength of this integrated teacher-researcher perspective.

5.1 From codes to themes

As expressed in the last chapter, the journey from data to codes to themes was in no way linear. However, to better understand how I chose to engage with the data I will demonstrate the coding process for a single extract and explain how they developed into themes. The final themes will be displayed on a thematic map to clearly show which themes link, and how.

The following figure (5.1) shows the initial coding process of a student’s video narrative.

Back when I was in primary school I thought secondary math [c1] would be really complicated and hard [c2] because I've seen my cousins and sisters work [c3] but turns out it's actually not that hard [c4], it's actually…not easy but it makes sense to me[c5]. …primary math is a lot simpler [c6]. For example we were doing addition and multiplication in primary so that we can calculate the answer with a calculator which makes it easier[c7], just in case we got something wrong we can double check. But in secondary, like in algebra, we couldn't really use a calculator to calculate answers [c8].	c1: thought ahead to y7 in y6 c2: expected y7 mathematics to be challenging c3: insight into y7 from the work seen of family members c4: reality of y7 was different than expected c5: student's own ability or mindset affect how they perceive challenge. c6: y6 mathematics is easier than y7 mathematics c7: calculator was a supporting tool c8: discontinuity of supportive tools

Figure 5.1 Example of coding

These codes were then exported into a spreadsheet and manually grouped and regrouped to form themes. For example, c1, c2, c6 were eventually grouped together into the theme "students expect change", however c6 also crossed into the theme "students value progress". These straddling codes allowed me to form a single, overarching narrative through the linking of the themes. The thematic map (Figure 5.2) and the shared narrative below illustrate the links.

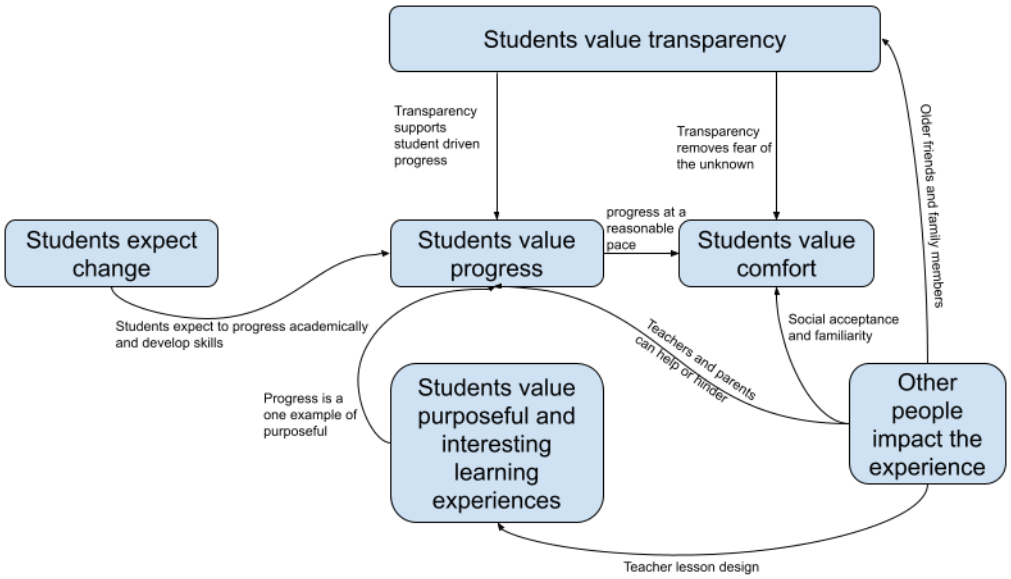

Figure 5.2 Thematic map

"Students expect a **change** from their primary to secondary mathematics learning experience and often hope this results in good **progress,** academic or otherwise. A key supporting factor for this progress, and a positive transition, is the **transparency** of the process. Students do not want this progress to occur at the expense of their **comfort** and therefore desire learning experiences that are **interesting** and **purposeful**. The **people** around them, peers, teachers, and family members, can influence all these aspects."

5.2 Presentation of narratives

These narratives each tell a unique story of transition. They do not present every single piece of data produced by each student. The connections to the selected themes are in some cases subtle, so as not to disrupt the flow of the student's narrative. However, each narrative will be analysed through the dual lens of stage-environment fit (SEF) and self-determination theory (SDT); the themes will be discussed in greater depth after the presentation of all three narratives.

5.2.1 Narrative 1: Benjamin

"That's it?! A welcome change".

The relief and excitement conveyed by these words could be sensed as soon as the email with the subject title "My Headline" was opened. This message came as a delayed response to the final focus group activity and prompt "if you were to write an article for the incoming primary students ahead of their move to MYP Mathematics, what would the headline be?". It was purposely presented to students at the end of their one-hour focus groups about the transition, with the hopes that the conversations had sparked or validated core feelings and thoughts on the topic. While the earlier activities had given them the opportunity to unpack multiple viewpoints, share perspectives and hear from others, this final activity encouraged them to take a simplified stance, essentially sharing a one-liner, a key takeaway, from everything they had collaboratively unpacked.

Benjamin had been one of the students to struggle with this, leading to him asking for more time. This was hardly surprising as he had been one of the most active participants in his group and undoubtedly had a vast number of thoughts swirling in his head. So, we agreed that he could submit his headline by the end of the week, after having some time to reflect. This activity, posed with the aim of capturing a snapshot of what students believed to be a synthesis of their important or overarching feelings about the transition, certainly was just a glimpse. It barely scratched the surface of the journey he had been on across the final year of primary and first year of secondary mathematics, but it still conveyed a key message of his story: hope and exceeded expectations.

Prior to his MYP Mathematics experience, Benjamin had studied in a local Hong Kong primary school from the age of 4. Further to this administrative information was the classification of him as an EAL (English as an additional language) student. This conclusion had been drawn based on his language competence on a test, coupled with his limited experience with learning, or at least schooling, in English. This label meant that he was entitled to additional support in class, accommodations were made in assessments, and, rather than attending English Language and Literature classes, he studied language acquisition with other EAL students. Beyond just an administrative label, Benjamin himself identified the English language as a competence he lacked but desired to attain.

The desire for an improved competence in this, or at least the aspiration for the lack of competence to not be a barrier, could be indicated on his start of year reflection. In response to “what helps me learn” among other things, Benjamin wrote “Google translate”. This perhaps highlights one way that MYP Mathematics can be considered unique; it is quite a language heavy course, despite the expected focus on numbers.

The simplicity and succinctness of his video narrative, along with a closed posture and slightly agitated body language alluded to a lack of confidence speaking in front of a camera. This was potentially due to his perceived

limited competence in expressing himself in English and the associated permanence of submitting a recording. Nevertheless, while his video narrative was brief, it still offered some valuable insight.

“Transitioning from primary maths to secondary maths. There is a huge difference. In MYP maths we are not pressured to do maths in class or at home which makes us feel free and happy.”

Only a few more sentences were uttered before the camera clicked off abruptly. This was by far the shortest video narrative submitted and Benjamin was similarly concise in his written reflections at the start of the year, as shown in Figure 5.3.

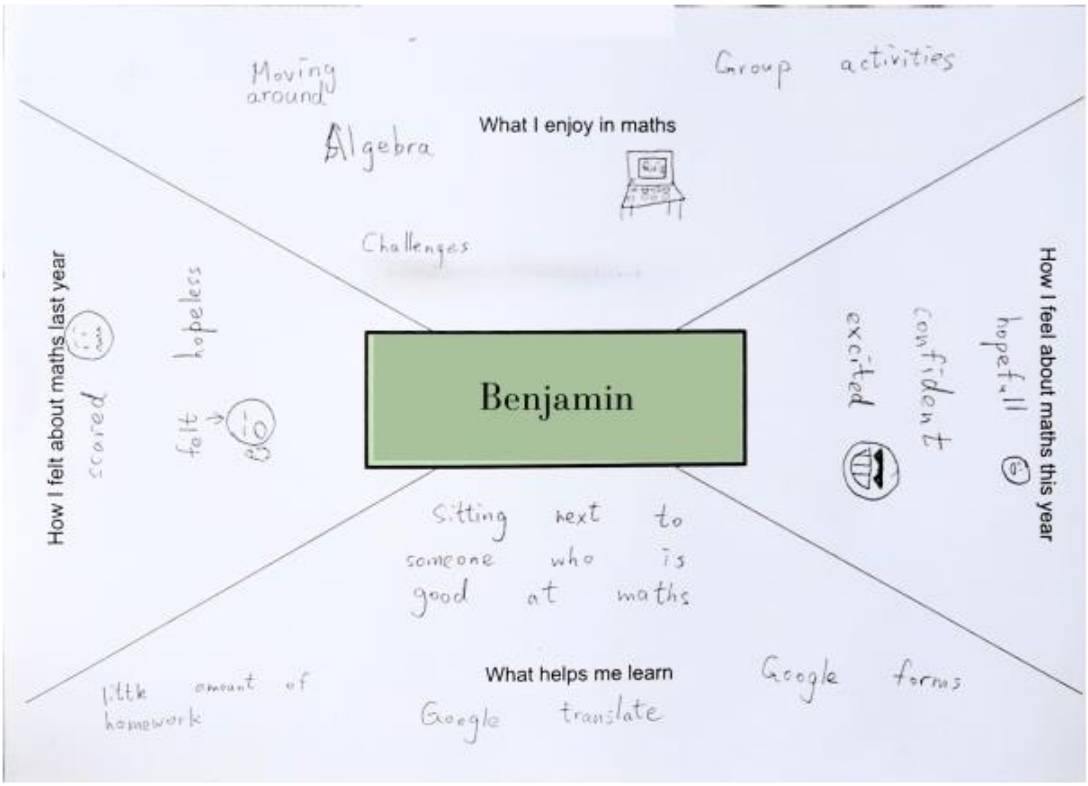

Figure 5.3 Benjamin’s start of year reflection

These words, both spoken and written, alongside the pictures drawn, offered a simple but clear initial insight as to how to unravel Benjamin’s journey from primary to secondary mathematics. While the reflection spoke of anticipated change, both the video and his final headline demonstrated the realisation of that. Despite the perhaps limited language capabilities, the use of the contrasting words hopeless and hopeful was no doubt intentional and spoke of a boy desiring a completely new school experience, for his future to look

different from his past. This was ahead of experiencing the new environment while the description of “huge difference” shows that he received the dramatic change he had desired, to some extent. However clear this message seemed, the brevity of these contributions had limitations; Benjamin had not expressed what he hoped for. He had also not shared what he had initially feared or what caused him to feel hopeless in primary school.

Therefore, a large source of information for Benjamin’s construction of his transition came from the focus group. Here it seemed that language was not a barrier, as he shared openly, candidly, and plentifully. Despite the discussion being recorded, like the video narrative, the combination of structured prompts and being around his peers seemed to encourage him to share his thoughts, experiences, and opinions with more passion. While each focus group brought a different dynamic, his group was constructed of students who had most recently attended local Hong Kong primary schools and were all in the Language Acquisition classes. So perhaps being around classmates of a similar background who were also new to the international school setting and studying in a language different from one spoken at home elicited the camaraderie needed to feel safe enough to share.

Benjamin’s verbalised construction of his transition was tied heavily to his “transition from”. He was a very active participant in the focus group, but much of what he said involved relaying encounters and experiences from his primary school. This was evident when students were asked to rank the four objectives from best to worst.

After reminding students of what each objective involved, the instructions were given to “put the best on the top and the worst on the bottom. Make sure you're discussing. You need to agree on the decision.”
Despite the prompt to discuss rather than dictate, Benjamin immediately selected A (knowledge and understanding), indicated a lower ranking and proclaimed, “...criterion A gives me horrible primary flashbacks. It gives me PTSD and I hardly get high scores out of it.” Ignoring objections from his

peers who suggested placing A near the top as “best” Benjamin reiterated “no, no, no, actual PTSD”.

This reaction was so out of character to the Benjamin previously seen that it felt more important to let him express this response fully, rather than placing emphasis on the focus group etiquette of turn taking. The mention of horrible flashbacks and repeated use of the phrase PTSD (post-traumatic stress disorder) exposed that his primary experience went beyond discomfort; it was a scenario he felt the need to escape and never relive.

Returning to the feelings of hopelessness referred to in the reflection, one can start to unpack why that is. A component of it was a lack of perceived competence, as judged by the lack of “high scores” he was given. The change of language from “objectives” posed in the task, to “criteria” shared by Benjamin, also signified a shift in focus from learning to assessment. This showed that Benjamin, like other students, held external validation and quantitative metrics as important. Benjamin’s primary school experience had had a role in shaping this belief: “in primary, it's all about survival. I mean, either you get good grades or well, your health…”. Placing academic attainment at the same level, or even above, wellbeing supports Benjamin’s earlier reference to feeling pressured.

Choosing to highlight student voice means that the words that Benjamin used, which may seem extreme, are true to how he felt and are not to be dismissed or belittled. The reference to PTSD and survival shows an experience in primary school akin to war. No matter the reality from the perspectives of others, this was not a healthy environment for a child or a feeling he should have had in a place intended to keep him safe.

Looking further into where this pressure came from and how this environment was cultivated was quickly revealed, as Benjamin was incredibly vocal about how his previous teachers had negatively influenced his mathematics experience.

“You know, what's the most horrible part of math test? Not the test itself, but the teachers. I study hard. They comment on your work. The teachers always give you the worst feedback as possible first. You did wrong on that. Why? I thought that was easy. Oh, why you didn't do that?”.

“And the teachers, they are super defensive. You ask a question out of curiosity and they shut you down hard. Basically “shut up” but not that, just harsh.”

“Our homeroom teachers are often math teachers, so they would actually judge the sinners, according to the grades. Oh, you did bad at maths. So you must be a punk. Such a difference, the guy here who had good grades. So he must be a good person.”

Benjamin’s narrative highlighted that the role of the teacher has the potential to be significant and impactful; in the case of his primary teacher, he only noted negative impacts. While unpacking identity goes beyond the scope of this study, it is evident that the interconnectedness of mathematical attainment and perception of self was a message that Benjamin felt his teachers were promoting.

Benjamin struggled to make any comments about his new school experience without comparing it to primary school, which again emphasises the significant impact it had on his mental wellbeing. The comments he made about his present learning environment highlighted his priorities.

One of Benjamin’s main focuses was the desire to feel seen and supported. He shared how that was met in his current placement and not previously. “We have freedom here. At least the teacher actually interacts with us.” This reference to being acknowledged as significant by a teacher and taking part in an active exchange was repeated when he mentioned differences in teaching.

“You actually gave us the explanations” referring to the learning process and the teacher’s active role. This contrasted with his previous teachers: “the teacher grabs the explanations from the book and there's the answer, go figure.” This validated his belief that his teachers did not consider how Benjamin would best learn or take his unique needs into account.

Due to Benjamin’s traumatic past experiences, he was very emphatic about the transformation of being in a lower-stress environment. Speaking again of his primary school he said, “they want you to learn, learn only learn no resting. Just learn.”
And later he said, “I got pushed too hard”. When asked what he thought the main difference was between the two school settings he simply stated “it’s more fun”. Even when probed in his interview to reflect on the fact that he had been learning concepts that would likely be encountered over the next two or three years of schooling and asked about this, he was firm in his conclusion that he did not mind.

(B=Benjamin, R = Researcher)
R: “So when we're repeating things that you already know how to do, how is that making you feel?”
B: “Yay! I'm a bit happy because well, at least I can master it and finish it within a few seconds and hopefully to jump into the other task.”
R: “But do you ever think, oh, I've done this before?”
B: “No, at least I could do it fast enough in order to jump into another tab.”
R: “So you never think, oh, I really want a challenge or, I should be learning, not just practising.”
B: “My dad taught me the hypothenuse of the triangle.”
R: “So you are happy to just learn things outside of class, even if we move quite slowly in class.”
B: “Yes.”
R: “So that means over the next few years, you'll still be repeating things that you already know. Do you think you are going to get bored or do you think you'll still enjoy maths?”
B: “I'll still enjoy it”.

This exchange highlighted how, at this stage of life, Benjamin's priority and motivation were to not feel stressed and to have fun. His focus was not necessarily on advancing academically. His reference to other tabs and tasks referred to the different levels of material available. So, Benjamin was happy to be busy and do a lot, but at his own pace, and not necessarily at a high level. This highlights that Benjamin felt secure in his level of competence. It is possible that this gave him a sense of success that he felt deprived of in primary school. He was less concerned about competence in terms of moving forward. Instead, he prioritised autonomy and the ability to choose his activities, what he moved on to, and when.

In regards to SEF, Benjamin's narrative highlights that his primary mathematics classroom was not a fit in terms of teacher interactions, quality of teaching and work expectations. In his opinion, what was offered in his secondary setting was a much better fit. The three categories fall rather conveniently into the three basic needs suggested by SDT, with relatedness being shown in the relationship, or lack thereof, with his teacher. The quality of teaching and the lack of guidance affected his feelings of competence. Then the choice in activity and the safer environment of secondary school allowed for autonomy.

Benjamin's narrative testifies that the construction of a transition is partly determined by where someone is transitioning from. In Benjamin's case his primary experience highlighted what he did not want and therefore clarified what he did want: more autonomy, feelings of success, a safe space that positively cultivated his wellbeing and a teacher who saw him as a unique student.

5.2.2 Narrative 2: Freya

A pivot to Freya's narrative equates to more of a focus on the academic aspect of the transition. The construction of her expectations and her response to her reality greatly amplified several of the themes. The first was

“students expect change” as Freya had high hopes that MYP would bring a positive change to her learning experiences. Also “students value progress” as this change was hoped to advance her academic attainment. Lastly, “other people have an impact on the transition” as Freya’s parents and teachers played a large role in ensuring her wants were met, at least to some extent. Freya’s story is an important one to share as it offers an alternative viewpoint to the theme “students value comfort” by questioning what comfort is and why this does not always mean familiarity.

To understand Freya’s perspective more clearly, it is beneficial to add context to her experience. Earlier in her primary schooling, she had been moved forward a year and was therefore entering secondary school at the age of 10. Despite being younger than her peers, Freya had demonstrated significantly advanced mathematical capabilities - the main reason for her promotion. Having attended the case study school for her later primary years, she had been identified as a gifted mathematician both by the school's placement tests and by the Hong Kong Academy for Gifted Education. However, despite this widely known status, Freya’s recent experience learning mathematics was that she had not been presented with learning experiences that supported her desired level of progress. This was shared openly in her start of year reflection where she expressed that maths was “too easy (x1000)” in primary school, adding a picture of a person holding a card saying “easy” for extra emphasis. She shared this experience further in her video narrative:

"In primary years I always was bored in class as I knew most of what was being taught".

While ease isn’t generally considered a negative thing, the framing of the subject as too easy suggests that this lack of challenge is not an ideal situation. This allows us to further understand the theme of “students value comfort” alongside the basic need of competence. By the metrics of the expectations for students in this year group, Freya was beyond competent and very aware of this. However, Freya was not satisfied with merely meeting this standard each lesson, indicated by the use of the word “bored”.

Merely mastering a task where she did not feel challenged was seemingly not enough to meet the need of competence for Freya. Instead, competence for Freya was more about extending her skills (Van den Broeck et al., 2010). Further discussions with Freya in relation to this point also highlighted autonomy as a need to be met. She recognised that she had often felt out of control in terms of the pace she was able to learn and grow within the classroom, which led to her feeling uncomfortable.

The period of transition, therefore, sparked an opportunity for a shift in Freya's perception of her schooling. More specifically, it allowed for her feelings of dissatisfaction over the past to become hopeful and expectant of a positive change. This can be seen in her start of year reflection again, in response to *How I feel about maths this year*. In response, Freya wrote "hopeful" and "excited" with a happy face. In contrast to her comments about ease, the hope is for a more suitable level of rigour in her secondary education. Purely saying hopeful would have suggested a small chance of change, whereas the follow-up of excitement instead indicates that there was anticipation for an expected favourable change. Freya really wanted to communicate this desire for challenge and progression to her teacher as she wrote, in response to *What helps me learn* "extra homework" and "writing equations 200 times (I'm serious)". In summary, Freya expected, and looked forward to, an increased level of rigour in MYP Mathematics. Furthermore, her choice of language, particularly the word extra and the dramatised number of 200, showed that Freya was aware that she differed from her peers and needed to be offered something more than them, and she wanted to make sure that her future teacher was aware of this too.

Freya's expectations for challenge continue to be shared within her video narrative. In these cases, the shared expectation came after the transition and was therefore tainted with the reality that had already been experienced. "As for the transition from PYP math to MYP math I thought that my passion for math would be allowed to advance and I would be allowed to pursue my goals for math in MYP". Here Freya shows that she expected more autonomy. The multiple uses of the word allowed suggest that Freya was not

seeking her new specialist teacher to take a leading role but was instead hoping for them to provide an environment that supported the ambitious attitude she arrived with. Freya was willing to drive progress and advancement and expected only support from her secondary school teacher. She was very clear that she had her own goals, that she was self-motivated, and that she would be the one reaching for these targets.

Freya also had some expectations about what this supportive environment would look like. "When I transitioned from PYP to MYP I thought that we would be switched into groups and would be learning based on our ability". Here she expressed the actions she believed her future school and teachers would take. She assumed they shared her beliefs about how students learn. Specifically, she believed that she required a different learning environment than many of her peers and that this could only effectively be delivered in an achievement-streamed classroom. This, however, was not typically in line with what the MYP framework would suggest. While this is not explicitly stated, what is discussed is that one of the approaches to teaching is differentiation, which involves supporting each child from the position of learning that they are currently at which is unique for them. In addition, the MYP only mentions different sets for when students reach year 10; at this point they are separated into standard and extended classes.

Due to this expectation and a belief that conflicted with the values of the environment she was stepping into, the reality of MYP Mathematics did not initially meet Freya's expectations. "I was kind of disappointed when it turned out we would still be in our classes and we would all be learning the same thing." The use of the word disappointed shows how important Freya's voiced expectations were in influencing her transition journey. Her expectations were not necessarily an assumption made due to a lack of transparency, in which case her response might just be surprised. Instead, her expectations were rooted in hope. She had built a belief about what the next season of learning would look like and, due to minimal opportunities to clarify, or perhaps even by being misinformed, this expectation had become a core belief that was optimistically anticipated, and therefore an opposing

experience could only lead to disappointment. This comment was a follow-up to the points about ability setting. Therefore, the first point of disappointment was that she was still with the same peers as in primary school. This was highlighted even further for Freya because she had attended the case study school in her primary years. Therefore, she knew the attainment of many of the peers in her new class, and she did not believe that she should be learning in the same way or being taught the same thing as them. Furthermore, as clarified in a later discussion with Freya and her parents, her reference to the "same thing" also touched on the element of repetition, she felt she was reviewing topics previously understood. Freya had seen some of her peers struggle in primary school with some prior topics that she had already mastered. Therefore, while she appreciated that some of these students needed to revisit these topics, she believed she was not one of them; she did not need to see the same thing as them and she did not need to see the same thing as in previous years. She was ready for more and was disappointed that this had not been identified, or, if so, not acted upon.

Fortunately for Freya, her ambition for mathematics was soon acknowledged. This was largely due to timely evidence of her attainment in the classroom. It was quickly seen through inquiry tasks that she had mastered most age-appropriate mathematics and beyond. From seeing this, Freya was given many opportunities to experience higher level mathematics and to work on tasks that differed from her peers.

"I was really glad when Ms C became my teacher as she always gave me advanced work to do".

In Freya’s recollection this change happened quite early as she associated her new teacher with that progression. However, in reality, she had of course experienced that disappointment and had therefore experienced at least a few lessons of learning experiences that she believed were not tailored to her level. In some ways this was unavoidable, or at least understandable, as to differentiate effectively, there must be some kind of student-teacher relationship. The teacher must understand where the student is and how best to get them to the next level. Some time needed to pass before that relationship was developed. However, particularly as Freya had transitioned

within the same school, insight into her performance and potential would have theoretically been available. The issue is partly the form in which this information was available - scores against quantitative reasoning skills which showed Freya to be exceptionally high, however, that number did not give a complete picture of Freya's capability. Still, with both teachers working in the same building, the key information could have been discussed or evidence of prior work shown. This echoes the complaints about a lack of communication between the primary and secondary school, which was frequently flagged as a common issue in literature.

One of Freya's standout experiences came as a response to a parent meeting with the gifted coordinator and mathematics teacher. In it, Freya shared her frustrations and her parents asked for further opportunities for her to progress. Freya and her parents were very responsive to the feedback that her communication skills were an area she could focus on improving and she gladly participated in tasks that supported this.

"I was really happy when Ms C gave me the matrices task when I was tasked to present a slideshow to my classmates explaining to them what matrices were and how they could be used to solve simultaneous equations."

This highlights the role of relationships and networks in creating an environment that addresses basic needs. Freya's parents were enthusiastic advocates for her progress and meeting her own aims. They were able to amplify the voice of their child in a space where adults may have had more impact than the key stakeholder, the student. This also shows the potential strengths of the MYP framework for offering a range of areas where skills can be developed. Having been assessed in communication skills, there was evidence to validate the claim that this was an area for improvement which likely helped to persuade Freya and her parents. This avoided the focus being on purely learning higher-level content intended for later years.

The step from expectation to reality was a significant and unfortunate part of the transition process for Freya, but by no means was it the end of her

journey. While it was important that she was heard and her needs met as far as possible, Freya was open-minded to the idea that there were other areas of competence important to develop.

"Honestly I was pretty disappointed with the transition but I still think that my focus in class has improved as I always had something else to do."

As the months progressed, Freya began to appreciate that learning mathematics went beyond simply acquiring new knowledge. Through her individual ventures, research projects, and opportunities to teach her peers, Freya saw the value in finding trustworthy sources, reflecting on how she best learns and communicating in a way suitable for a specific audience. Freya thrived on growth and, therefore, knowing that she was developing in different avenues was sufficient for her to overcome initial disappointment. This holistic realisation could be seen in her final submitted headline: “PYP to MYP - the new way of learning”.

5.2.3 Narrative 3: Olivia

The final narrative summary comes from Olivia. Her story was chosen as it highlights the need to take a step back and remain aware that, while the focus of this study is on a somewhat academic journey in a specific subject, one’s experience cannot be looked at in isolation. Olivia shows the importance of context on one’s perception of an experience.

“Thank you for listening to my interview. I hope you have a nice day.” In the moment before the camera shuts off, Olivia visibly releases the tension held throughout her recording. Her shoulders relax; the ever-so-slightly raised eyebrows and pursed smile soften. The video began with the tucking of an imaginary hair behind her ear, a minute nudge of her glasses up her nose and a slight throat clear ahead of her opening line, “in this interview I will share my opinion on what I think about MYP math compared to PYP math”. This developed composure was now dropped in an instant. The expert lighting, assistance with filming by the recruitment of a sibling, and the cue cards used, provide a stark contrast to the other submissions, often recorded with a shaky phone propped precariously on the edge of a desk, punctuated

with “ums”, “like” and “I guess”. This high standard of video submission already alluded to one of Olivia’s traits; a commitment to excellence across her school life.

Olivia’s educational context offers some insight into her motivation to dedicate substantial effort to a task such as this with no obvious personal gain. As a music scholarship student, Olivia spent her last two years of primary education in an international school, moving from a local primary school at the same time as her older brother joined the case study school, on a leadership scholarship. The two of them were often commended for the high bar they set for themselves, showing a strong internal drive to excel in academics and beyond. On the other hand, the route of her admission, and the subsequent annual reviews, had been the source of several anxious conversations in pastoral settings. Through these interactions it was seen that the perceived lack of permanence, in terms of school place, lead to uncertainty and, ultimately, diligent work efforts.

The mid-primary move meant that, while Olivia had experienced the PYP curriculum, she had also recently been educated through the local Hong Kong curriculum. Unlike a few others who were in that position, she did not refer to it at any point, keeping comparisons purely between her current secondary education and most recent primary education. Within her start of year reflection, Olivia stated that she found mathematics in PYP “half half - easy and difficult at the same time”. Looking ahead, she shared that she was “quite excited about learning new subjects in maths”. Her ambition to do well and reflective nature were evident in her response to *What helps you learn* as she was very open to sharing that she needed clearly explained problems, a calm atmosphere, clear definitions, quiet areas, and a dictionary to help translate subject-specific terminology and worded problems. When writing about the components she had previously found enjoyable in her mathematics education, she described a variety of mathematical topics, focusing predominantly on geometry and spatial reasoning. Additionally, she mentioned that she enjoyed participating in activities such as scavenger hunts, riddles, digital quizzes, and brain games. Of all the students, Olivia

shared one of the most detailed reflection sheets, suggesting that she was already in the habit of thinking about how she learns.

In the first task, a prior knowledge check addressing all four objectives, Olivia showed strong computational skills in response to the purely numerical questions. In response to the real-life modelling task, while she eventually produced a thorough and well-structured poster to communicate her final findings, she initially misinterpreted the task and persisted with the incorrect lines of reasoning until redirected. When she was alerted to her misinterpretation of the scenario, she was very apologetic and quickly refocused to ensure she did not fall behind her peers. A similar story could be seen in her investigation where effort appeared to overtake understanding. For example, when asked to predict, rather than looking for a pattern in her previous findings and making a reasonable guess, she derived the solution for three further cases. When asked to state a relationship between results, she ignored the constraints of the answer box, instead sharing her process and answers again. Her long explanation flowed into the margins of the page and around the edge of the paper, but with no evidence of critical thinking shown to summarise what her results showed. In the latter two tasks, despite her peers asking questions around her, Olivia never once asked for clarification and seemed determined to produce results without intervention. That being said, she was open to feedback when it was given, but she never proactively sought it.

Moving ahead a few months into secondary school life, it was time for students to record their reflective video narratives. After introducing herself, Olivia chose to start her commentary by focusing primarily on the content taught in the year so far, and making a connection to what she had previously learned. Casting her eyes down slightly to read from her cue cards Olivia first shared what she had been learning in MYP Mathematics up until that point. “...for the first four units we learnt about patterns in algorithms, fractions, decimals and percentages, algebra and our current unit, time, area and perimeter.” She paused, looked up and continued. “Firstly, in my prep 6, I learned about area and perimeter, volume, conversions, discounts and

algebra.” Upon saying area and perimeter for the second time, Olivia’s left hand came into frame as she slightly gestured to the left, acknowledging that she had said this before, emphasising the repetition of topics. Interestingly, despite algebra also being repeated in this latter sentence, the same body language was not replicated. Aside from the slight gesture, there was no indication in tone as to how Olivia felt about these topics, repeated or not. The concepts were presented objectively, laying the groundwork for what she wanted to convey next. “So right now, currently I am finding MYP maths to be quite great because previously I have already learnt some of the subjects from MYP.” This was the first indication given that her perception of repetition was positive.

Olivia’s reasoning for viewing the repetition as a benefit rather than regressive or time-wasting was revealed as she continued. “When I first came to school, it was quite a relief to know that I already knew some of the subjects in math because at that time I was a bit worried about how I would be finding my subjects and other worries such as transitioning to MYP. So, I found this very comforting knowing that I didn’t really have to worry that much about math and knowing that I didn’t have another layer of worry placed on me.” There are several key principles to extract from this single statement.

Firstly, Olivia communicated that she felt a significant level of trepidation ahead of the transition. When thinking back to her past self, on the verge of moving from primary to secondary, she recalled a student who had anxieties and doubts about the anticipated change. While mathematics would have been included within her reference of her subjects, another important point is that, despite the focus of the video being mathematics, Olivia could not fully extract her transition experience relating to mathematics from her full transition experience. What she was able to acknowledge, however, was that revisiting topics that she had already seen lessened the amount of worry she needed to attribute to the subject, which lightened her burdens slightly. Knowing Olivia's tendency towards caution, her use of the phrases "comforting" and "not having to worry" suggests she felt more than just familiar with the topic, there was more likely a quiet confidence and a sense of reasonable understanding.

This mention of worry was expressed again in Olivia's headline submission, specifically within the subheading "Prep 6 class hopes for no worries during MYP years." Despite this headline being written towards the end of her first year, Olivia's choice of phrasing does not show any form of conclusion as to whether these fears were founded or not. As the fictional article was aimed at the incoming primary students, this suggests that there was some validity in the worries, as she did not take this opportunity to reassure them. This perhaps explains why the heading read: "Interesting yet tiring": *a Year 7's opinion on the transition between PYP and MYP*. The effort to communicate the complexity of the transition experience serves almost as a warning, signifying that while certain actions meant that there were not as many additional burdens as she expected, it may be the case that Olivia was going to feel anxious regardless. The tiring feeling came from the mental load of concern.

For Olivia, at this stage of transition, some of her priorities were appearing and feeling competent, more so than actually being competent. This was evident in her resistance to ask for help. An insightful discussion at a parent-teacher-student conference offered context to this. One identified issue was that Olivia lacked a sense of security in her environment. Specifically, in an academic setting she did not feel comfortable showing a lack of understanding and she felt asking for help implied this. There were further social-emotional cues which go beyond of the study, but which echoed the feelings of lack of security. Within the narrow context of academics and mathematics, this led to one co-constructed target on her first report focusing on building relationships with her classmates. It was felt that the priority of feeling safe in an environment preceded the habit of asking for help, and that relationships could support this.

5.3 Presentation of themes

While the exploration of narratives provided some results to analyse in the individual's context, looking across cases but within themes supports synthesis and provides focal points to create multidimensional meanings. This section will involve the analysis of the following themes and the relationships between them.

- Students expect change
- Students value progression
- Students value comfort
- Students value purposeful and interesting learning experiences
- Students value transparency
- Other people have an impact on the transition

Each section explores the identified themes by first defining and outlining their scope. In each section of analysis, student responses will be presented to support the theme. These findings will then be discussed with relevant literature to establish their alignment with theory, contributions, or contradictions. Each discussion will seek to connect themes and suggest some considerations towards the research questions.

5.3.1 Students expect change

Regardless of their primary setting, as students looked ahead to MYP Mathematics, they anticipated that they would encounter a different learning experience than the one they were accustomed to. This is useful to understand, as from the individual narratives it was clear that the construction of the transition experience was based upon the juxtaposition of expectation and reality. It is therefore beneficial to understand that students are not necessarily basing that expectation on their present experience.

While the focus of this theme will be on the presence of this expected change, there will also be some discussion about whether it is the subject that is expected to change or the students themselves. In addition, there will be discussion on whether the expectation was positive, negative, or neutral in contrast to their previous maths learning experience. To further clarify the scope, the focus is not on the reasons why they had these expectations, or if their predicted change came to fruition. These ideas will however be developed in the presentation of later themes and in the final discussion of the research questions.

While the other themes draw upon several different sources as support, since this theme was about expectation, it is primarily based on the data generated at the start of the school year, prior to students experiencing MYP Mathematics. Specifically, in one of their first lessons, students were asked to complete a document responding to several questions and prompts. They were told that they could write or draw their responses and share as much or as little as they felt comfortable with. This theme shines a light on the commonalities and discrepancies of the answers to the two prompts:

- How I felt about maths last year
- How I feel about maths this year

However, this data was not analysed in isolation and students still spoke retrospectively about their thoughts and feelings at later stages. Therefore, the conclusions drawn from these prompts were formed in context, against the wider data generated, and in the context of our student-teacher relationship, class dynamic and conversations outside of the study.

Most students commented on the difficulty level of the subject or how they felt learning it. Only one child referred explicitly to the teaching of the subject and no one expressed their perspectives about the classroom experiences. This is likely since other prompts on the worksheet addressed these areas more explicitly. The presentation of results will show a child's response to both prompts, placed side by side. This is to display the extent of changed perspectives. The left side shows the students' feelings about their Year 6 mathematics experience while the right side shows how they felt about what was to come, prior to experiencing a MYP Mathematics lesson. Descriptions of any images are shown in *italics.*

Students expect more challenge

A common expectation communicated by most students was that they expected the subject content to be more challenging. This links to the theme as there was an expected change in not only the content they expected to see, but also the level of rigour. The comments below came from Harper and

Elliot, two students who had studied at the case study school in their primary years.

How I felt about maths last year	How I feel about maths this year
It was kind of easy, but there were times when I can't follow up.	Challenge. I think that the math this year is harder, it would be more challenging

Table 5.1 – Harper

How I felt about maths last year	How I feel about maths this year
It was fun because the teacher taught us in a fun way but it was a bit easy and for most of it I was just practising rather than learning new things.	I think it is going to be more challenging and fun because my brother talks about how hard some parts of maths is.

Table 5.2 - Elliot

Both students expected a shift from a learning environment where the mathematics taught was fairly easy into an environment where the mathematics was more challenging. What can be seen on the left-hand side is their ability to position themselves in their response. Harper, for example, acknowledged that the mathematics was easy and that it was her that couldn't follow, focusing on her perceived lack of competence. Whereas neither commented on how they predicted they would feel about the additional challenge, although Elliot may be suggesting that he would find the challenge fun rather than stating that the subject itself was fun. Other students were more explicit about their stance in response to the expected change.

Some students respond positively to expected change

While in the above responses, the students did not seem to have a significant change of feeling because of the challenge, some students

showed positive anticipation of their new learning environment. Their responses are shown below.

How I felt about maths last year	**How I feel about maths this year**
Too easy (x1000) *Sweaty face holding card which says "easy"*	Excited Hopeful *Happy face*

Table 5.3 – Freya

How I felt about maths last year	**How I feel about maths this year**
bored or too easy *straight face* *paper with “100” on*	 <u>enjoy!!!</u> *smiley face*

Table 5.4 – Mason

How I felt about maths last year	**How I feel about maths this year**
half half - easy and difficult at the same time *straight face*	*big smile* quite excited about learning new subjects in maths

Table 5.5 - Olivia

These students did not explicitly mention an expectation of challenge in secondary mathematics on the right; however, the reference to primary mathematics being easy and the absence of this mention on the right implies that they do not expect this to continue. Also, Olivia’s mention of new subjects at least acknowledged that there would be a change in content. The connection to change here is the change in emotions, primarily conveyed by the images drawn.

Some students had a similar change in emotions, that is looking forward positively, but with less evidence that it had anything to do with a perceived challenge.

How I felt about maths last year	How I feel about maths this year
Scared *Nervous face* Felt hopeless *Face of despair*	Hopeful *Happy face* Confident Excited *Cool face with sunglasses and grin*

Table 5.6 – Benjamin

How I felt about maths last year	How I feel about maths this year
I keep on forgetting what I learned	I will enjoy learning

Table 5.7 – Grayson

How I felt about maths last year	How I feel about maths this year
Nervous *worried face*	I am really excited to learn more about MYP maths because it is crucial to living a good life. *bubble with 4 operations and happy face* *arrow pointing to dollar note and house with smile*

Table 5.8 - Aria

How I felt about maths last year	How I feel about maths this year
Challenging Hard Confused *Straight face with question mark*	Excited *Smiley face* also a bit nervous because I don't know how maths this year is going to be like

Table 5.9 - Isla

While the previous section offered insight into why Benjamin had a positive perspective on his future learning, all we can really glean from the remaining comparisons is that positive expectations can be motivated by factors other than challenge. Grayson elaborated on his brief comments later in his interview and shared that he was quite “lazy” in primary school but in secondary school planned to “take good notes now”. The focus on his attitude and approach, rather than the subject, reveals that the change he was aware of was on him as a learner, and the effect this change could have on his enjoyment. Despite feeling “nervous” about mathematics in primary school, Aria - who self-identified as "not being a maths person" - was able to reframe her expectations through the lens of her priorities and goals, driven by the desire for a "good life". It is unclear if this is a new perspective, and therefore the change is her mindset, or if she views MYP Mathematics as more useful than primary school mathematics, in which case the change is in the subject. Finally, Isla made it very clear that she was uncomfortable in mathematics previously because of its challenge and yet had a positive outlook. This again suggests either a change in her as a learner or an expected change in the learning environment; perhaps the style of teaching as it seems unlikely that she would expect less challenge going forward.

Some students respond negatively to change

Not all anticipation of change was viewed in a positive light. Darcie and Kai both attended the case study school in their primary years and therefore would have had more insight than some of their peers about the reality of MYP mathematics. For both of them, they were nervous about what was to come, again because of the perceived challenge.

How I felt about maths last year	How I feel about maths this year
It was a little challenging but it was fun learning maths	I am nervous of what challenges that will appear

Table 5.10 - Darcie

How I felt about maths last year	How I feel about maths this year
Math last year was pretty easy but it really does depend on the subject. *straight face* *happy face*	I am a bit nervous since MYP maths may be more complicated and hard, and I am also a little scared, however I am ready for a new challenge. *worried face* *flexing arm*

Table 5.11 - Kai

While these students had a different perspective from the others, all these comparisons show that students expect their learning experience to be different after the transition. From some they expected the content, level of rigour or style of teaching to be different, all external factors that at the time may have been seen as unknown. However, a few students suggested a change in themselves and the way they would learn.

Discussion

The idea of primary students expecting secondary school to be different is supported in literature (Doerr, 2020) with it expected to be an environment with greater challenges and opportunities. Specifically, when discussing mathematics, students often anticipated the work in year 7 to be harder than in year 6 (Attard, 2010; Howard & Johnson, 2004). However, unlike the responses shared by students within this study, other studies suggest that students look ahead to this challenge with concern or anxiety (Waters, Lester, and Cross, 2014). Instead, most of these students were positive about the expected change with just some instances of apprehension. These mixed feelings were somewhat in line with Hodgkin et al. (2013), although their findings were based on students' responses to the wider transition, primarily relating to social changes rather than specific to a subject.

Those who were less explicit about a change in the external factors may have been recognising an internal change in their identity as a learner or as someone who is growing up. Hodgkin et al., (2013) found that students believed that the transition signalled an opportunity to act and be treated as more grown-up. Similarly, Doerr (2020) recognised that some students embraced this transition as a fresh start and an opportunity to demonstrate personal growth. More broadly, Bosma and Kunnen (2001) identified that transition periods can play a vital role in driving identity development, a feature also associated with adolescence (Wigfield, Lutz and Wagner, 2005). These findings were reflected in these students, who could see a distinct difference between their past selves interacting with the subject contrasted with their future selves. In the context of stage-environment fit (SEF) they were expecting that the new setting would respond to their current stage, specifically in terms of what is taught.

The discussion on change can be related to that of continuity in literature, with researchers (Cantley et al., 2020) identifying that both curriculum and pedagogical discontinuity can lead to disengagement and have negative academic implications. However, continuity corresponds more to alignment rather than staying the same, and is therefore not a contradiction to change. In fact, continuity would assume a gradual change, in line with the advancements experienced previously. So, it was the use of language surrounding challenge which was more unexpected, as this suggested a more rigorous pace of change than experienced before.

When considering where they expected this challenge to occur, their language can be better understood in context. As a class generally, there was a lot of focus and discussion about the content within the subject. In one case, when a group of students were demonstrating how “hard” maths could be, there was a flurry of writing advanced formulae on whiteboards to show what they believed they would be learning in the coming years. There was no mention of teaching methods, pace, or assessment which may mean that these students did not expect change in these areas. This too is supported in the literature with Kaur, McLoughlin, and Grimes (2022) identifying that

students expect learning experiences to be more activity-based, as in primary school. Another point to consider is that discussions on continuity have occurred after transitions, not before. As much as I seek to uplift student voice, a prediction is much less informed than hindsight. So, while many of them reacted positively to expected change, students' feelings after transition may not be as optimistic, as in literature.

This theme revealed that students expected their environment to change and, for some, that expectation extended to themselves. What was not said was just as valuable as what was said. Responses suggested that the main change would be the level of rigour in content; however, there was no indication that there was an expected change in teaching approaches or classroom environment. This resulted in students primarily questioning their competence to handle the change rather than shifts in relatedness, peer relationships, autonomy, and the way they would be learning. This offers some insight about the areas of continuity that are most valued by students at this stage.

5.3.2 Students value progress

A recurring topic in the students' narratives was sharing when learning had taken place, improvements had been made or grades had been positive. This was understandable as, through the study, the transition journey had been concentrated on to a single subject, MYP Mathematics. Therefore, students felt more inclined to evaluate success in that subject rather than mention other factors of their experience. Retrospectively, students shared their appreciation of evidenced learning, whether that was improved knowledge, understanding, confidence or skills. In addition, students were vocal about their dissatisfaction when they felt they had not moved forward.

Students often expressed appreciation for learning new things, both by placing value on the topic they had explored and by acknowledging their own personal improvement. Kai, in his video narrative, identified the introduction of algebra as valuable.

> “Something I enjoyed in MYP math is learning about algebra. It definitely made a huge difference because everything makes sense now.”

At the time of sharing this, Kai was referring to the fact that he was able to better understand the glimpses of equations spotted in his older sibling’s school books. However, Kai was able to share at the end of the year that this seemingly independent unit had continued to facilitate his meaning-making processes in other units we had studied, including equivalence in proportion and formulae in geometry. This amplified his satisfaction with learning and the progress he felt was made. The positive experience of learning new things relates to the need for competence. Rather than just identifying that he had been taught about algebra, Kai stated that he felt he had learnt something through that process, and that was the aspect he found enjoyable. It can therefore be identified that an increased sense of competence resulted in positive feelings.

There was evidence from the data that showed that students were frustrated when they felt that their progress in mathematics remained stagnant or declined during the transition. Freya’s narrative from the previous section of the chapter was a clear indicator of this:

> “When I transitioned from PYP to MYP I thought that we would be switched into groups and would be learning based on our ability and not just in our classes but I was kind of disappointed when it turned out we would still be in our classes and we would all be learning the same thing.”

As discussed through her narrative, one perspective on this was that she wanted to be distinguished from her peers. She did not want to be “learning the same thing” as others. Her perception was that by being put in a class with peers who had similar prior attainment in mathematics as her, her progression would be more rapid and she would encounter different concepts than peers in the other classes. This highlighted Freya’s need for relatedness

and a desire to find a like-minded community or class to support her progress.

Another viewpoint of “learning the same thing” was the reference to learning the same content as in previous years. This was voiced by many students and highlights the recurring thread of repetition that appears throughout many of the themes. The revisiting of topics from primary sometimes felt to students that they were not progressing, but that learning was stagnant or cyclical. Through the lens of this theme, repetition was not always valued because it suggested a lack of progress because of no new learning.

However, some students made a case for repeating subjects as a means for progress. One viewpoint offered the perspective of repetition as enhancing the depth of their understanding rather than its breadth. Another acknowledged that repetition was needed to make up for any regression that had occurred during school holidays. So, while there was no progress in the sense of new learning, gaps were essentially being filled and understanding strengthened. The first point is discussed more in the later theme of purposeful learning experiences. However, the latter point where progress is reframed as deepening understanding rather than just the acquisition of new knowledge, is shared through two insightful metaphors across different focus groups. Both excerpts are in response the focus group prompt of “many topics are repeated”. Students were asked whether they agreed or disagreed and to justify their choice. The following comments were relatively close to the end of these discussions after students had shared perspectives and, in some cases, coming to a consensus.

Focus group 1

> Noah: Why? Because they might forget the skills and learning them twice means that you can remember better. Like if you watch a movie, you watch it once you can remember the most important parts. But when I watched the same movie twice, I can remember more of the non-important parts in the movie as well. But in maths, everything is important. So they remember more and more things.

Focus group 3

> Aria: Well, technically we didn't really cover it, just touched on it
> Freya: It was like, it's just secondary is more in depth. But like, if you've learned it at home, then it's still very easy.
> Aria: It's like, primary, you step into the sea and then secondary you just go down, like to the dive
> Freya: Snorkelling to scuba-diving
> Aria: Yes that's it

Both excerpts suggest that primary school experiences provide the big picture for content and skills, enough to appreciate the overview and be able to summarise key points. However, when these ideas are revisited in secondary school, there is an opportunity to strengthen understanding, fill in details, and appreciate new ideas. This desire for understanding over achievement and mastery over performance validates the definition of progress as a learning process rather than a fixed goal post of attainment.

Most of the time, the viewpoints were not so dichotomous, with students identifying one process as positive and leading to progress or another as negative with little progress being made. Largely it was seen that students were appreciative when they had learnt something new, even if the learning was at times uncomfortable. Again, the theme of comfortable learning experiences will be discussed further, later in this chapter; however, this theme offers a bigger picture view of the impact of temporary discomfort for the sake of longer-term progress.

Within Kai's video narrative, he shared about how the feedback given after assessments could be beneficial for his progress.

> "To be honest I think my feedback is actually pretty useful because I can reflect on my feedback and see what I can do better next time even though sometimes my grades aren't the best but it's fine to me because I know which areas I can improve upon and get a better grade next time."

Students received a “what went well” and “even better if” comment after submitting a piece of work as well as a grade if it was a summative assessment. This meant that they were always informed of what they were successful in, as well as a point for improvement or reflection. In this comment, Kai is praising the longer-term impact of receiving feedback on his capability to progress while acknowledging the potential discomfort of seeing a less than perfect grade.

Other students shared an awareness that long term progress might come at the expense of short-term comfort. Aria demonstrated a shift in perspective when considering her attitude towards the homework set or revision ahead of an assessment.

> “But here I needed to do at least one hour of math a week outside of school so I was like, why do I need to do this? This is unfair. But then I soon realised that even though some aspects of math might be a bit difficult or boring, I still have to do it to develop my skills.”

Aria explained that she initially looked at the task or action at face value. When considering using her free time to continue working on tasks on a subject that she did not have a passion for, it was hard to see the appeal. However, considering home learning as a means to an end, particularly one that benefitted her personally, made it feel worth it.

Aria continued to express that the journey was by no means easy as she began to speak about the pressure she faced when completing assessments.

> “I think you progress each time you do a unit, each time you do a test, each time you’re put under pressure. That's a good thing about secondary because there are a lot of higher expectations, a lot of pressure and even the pressure may not be for the faint hearted like me. You still need to try your best and then you’ll enhance your skills.”

Kai's acceptance of his less favourable grade and constructive feedback and Aria’s reframing of homework and tests as beneficial speaks to the presence of strong affective skills. Kai’s focus on what he could do better next time and Aria’s ability to see the greater good in completing less-appealing tasks

showed that they believed that not only could they progress, but that their attitudes and actions were the gatekeepers to this progression.

The attributes of a growth mindset and value seen in depth over breadth on the one hand showed an open-minded perspective on progress from the students. However, it was clear throughout the discussions that students associated progress in the subject primarily with strengthened understanding of the content. Perhaps, to some extent, students were aware of a shift in mindset throughout the year, but they did not express the same appreciation for growth in this area as they did in their mathematical understanding. By assigning value to a wider range of factors, students have greater opportunities to progress as a result of learning experiences, which do not necessarily introduce more content.

Discussion

Within this theme, students demonstrated that they valued academic progress and were not satisfied when progress was not being made. This is supported by self-determination theory as “children are intrinsically motivated to learn” (Ryan and Deci, 2017, p.351). The desire for academic progress is not just the case for students, with the record of this progress reported to parents, schools, administrators, and within research. This can be seen in literature with crude measures against topics being used to quantify progress (Ryan, Fitzmaurice, and O’Donoghue, 2021) and data mining being used to inform transition interventions (Orhani, 2022). However, within this study, the framing of progress evolved across the transition period; there was later an appreciation for depth over breadth, seeing value in the journey of growth over the destination of a grade, and valuing progress beyond just content acquisition. This is despite findings, referring to the stage of adolescence, claiming that students at this stage focus more on performance than mastery (Evans, Borriello and Field, 2018).

While students' initial viewpoints on repetition was supported by Skilling, Bobis, and Martin (2021) who identified that repetition may lead to disengagement, their shift in perspective also echoed the differences

acknowledged between primary and secondary mathematics as in literature. In particular, the shift to a subject specialist (Buniel and Ravichandran, 2018) and a focus on teaching for understanding (Mowat, 2019) resulted in a change in teaching methods (Mudaly and Sukhdeo, 2015). Therefore, while concepts being revisited alluded to discontinuity and even regression, students acknowledge that they were likely being addressed in a different way to address key understandings that may have been previously missed (Nicolescu and Petrescu, 2015).

Freya's story highlights the possible role prior attainment plays in the construction of progress. In particular, her expectation of being placed in a different set. The IB is not a proponent of having students set by attainment in mathematics until their fourth year of the course (year 10) when they highlight a standard and an extended framework (IBO, 2019). However, they do identify differentiation as one of their key approaches to teaching in the MYP (IBO, 2014, p.68) stating,

> "Differentiation (modifying teaching strategies to meet the needs of diverse learners) can build opportunities in which each student can develop, pursue and achieve appropriate personal learning goals".

While the debate for and against streaming and its impact on progress is beyond the scope of this study, Freya's comment frames her perception of what progression looks like to her. Her perception was that by being put in a class with peers who had similar prior attainment in mathematics as her, her progression would be more rapid, and she would encounter different concepts than peers in the other classes. This highlights Freya's need for relatedness and a desire to find a like-minded community or class to support her progress.

As seen in her narrative, Freya was able to shift her personal learning goal to focusing on research and communication skills by learning about a higher-level topic and delivering a lesson to her peers. It is the student's reframing of progress that is a worthwhile focus for this theme; students being able to appreciate the development of other skills and value the wider journey of learning. As teachers, this can be cultivated with a focus on one of the

approaches to learning (ATL): affective skills. This is one of the ATL skills which the IB expects MYP teachers to explicitly teach through their subjects and addresses “mindfulness, perseverance, emotional management, self-motivation and resilience” (p.110, IBO, 2014). Research into the MYP has shown that self-management skills in general (under which affective is one) are seen in students in the MYP who are more likely to be encouraged to take ownership of their learning (Hutchings Jr, 2010). This appreciation of other skills being developed (Visser et al., 2023) will also link to a later theme of purposeful learning.

5.3.3 Students value comfort

While change was expected, and progression desired, how this was achieved affected students' motivation. When the road map to progression was comfortable, students expressed more appreciation. Within this theme, comfort can often be defined as familiar experiences, in comparison to primary school, or new experiences with a gentle learning curve. Conversely, uncomfortable experiences were experiences that were unfamiliar, unexpected, or perceived as too challenging or too quickly.

Where the previous theme of progression saw that repeating topics from primary school could be considered as halting or deepening progress depending on different perspectives, through the lens of comfortable learning experiences, repetition was primarily considered to be a layer of comfort. This was because students were familiar with a topic, making them less likely to feel anxious or perceive a daunting learning journey ahead.

Olivia’s story spoke to this point explicitly as she shared in her video reflection, “that was quite a relief to know that I had already done some of the subjects in math…I found this very comforting knowing that I didn’t really have to worry that much about math and knowing that I didn’t have another layer of worry placed on me”. She expressed appreciation that her energy and focus did not have to, additionally, be on her mathematical progression and grades, but on feeling secure and safe in her new school environment.

Others shared more implicitly about how repetition at the start of the year helped themselves, and others in the class, feel comfortable. In her video narrative, Aria shared how she felt about looking at the four operations in the first week of term. This activity had been presented as an assessment task to introduce students to the four criteria, but ahead of this, they had shared their methods of multiplication and division. This was partly to share good practices, but also to see how students from different parts of the world had been taught. Aria noted that having the opportunity to review them “was really nice as well after the long summer holiday, we might have forgotten it a bit”. This highlights the relationship between comfort and competence. Being out of a learning environment for a few months could result in some students forgetting and lead to overwhelm if they are progressed to further levels of learning without revisiting these concepts.

Noah also acknowledged the potential benefit of repetition being comforting at the start of the year, while people’s expectations of mathematics may be high. “I know it makes some people relieved. And that includes a little bit of me, but not completely.” This focus on other people, and Aria's use of the word “we” in her statement shows that there is an awareness of other people’s needs and comfort as well. So, while repetition allows for comfort in an individual's sense of competence, it also links to relatedness and the acknowledgement that a classroom involves the needs of many.

Conversely, learning new content and concepts that felt beyond the student’s competence was seen as uncomfortable. Darcie shared the following in her video about MYP Mathematics: “sometimes hard because the teacher keeps on telling us new techniques and new things to calculate stuff and it’s like hard to get used to a formula or a thing to calculate in a maths problem, and I think that’s my main struggle in MYP maths”. Darcie's language, behaviour and attitude, both here and throughout the year, revealed a sense of overwhelm in regards to the pace of learning and instances of experiencing too steep a learning curve. She stated that it was not only the content that is different from primary school but also the methods of solving and the styles of tasks presented. She often shared that she felt “behind”, particularly when

she compared herself to others, and felt she took more time than them to grasp new topics. This multi-levelled nature of “newness” highlighted potential discontinuities between the bridges of pedagogy and curriculum. This sense of doing too much too quickly caused discomfort, potentially making students feel out of their depth and incompetent.

This narrative of discomfort as a result of dealing with a change in environment in comparison to primary school was echoed by many students. Elliot, who had attended the case study school in his primary years, shared in his video that the amount of homework he had to complete was a huge increase.
“So for homework I feel that it is a big step up. It is quite unusual to be getting homework from every subject, it is not something that I am used to. Particularly for maths, I never had homework. I think most of my classmates never did.” While he does not explicitly state this amount of homework as negative, referring to it as unusual and identifying it as something that he is not used to signals at least a small shift out of his comfort zone.

In the same way, a reduction in homework was comforting to Benjamin who was used to “14 pages a day” from his local primary school whereas “in MYP maths we are not pressured to do maths in class or at home which makes us feel free and happy. Assignments would only come in once every two weeks and they are often to the point.” As shown in the individual narratives, Benjamin often framed his current perspective in comparison to his previous experience. Therefore, because he had framed his primary experience as very stressful, significant changes which reduced that stress offered great comfort, particularly in comparison.

When looking at Elliot and Benjamin, even though they are talking about the same learning experience, homework, they have very different perceptions of how it affects their comfort level. This highlights how the way students' narratives are constructed considers multiple factors, including their prior experiences.

In keeping with the point that change can be comfortable or uncomfortable depending on how gradual or extreme the change is, Noah added some context to a point raised in Elliot's video narrative that most students disagreed with in the focus groups. Elliot's comment "you could improve this by lessening the platforms we use so we can more easily find our homework and keep track of it. So rather than using… (listed several platforms), sticking to one would be very appreciated." Initially the impression of this was that navigating multiple platforms was a challenge, so this was posed as a prompt in the focus groups. However, Noah made the point that "online learning really changed that…we do use more than back in year six, but it should be fine. It's probably okay." In previous years, the digital jump may have felt more extreme from primary to secondary, but as students had experienced their final year of primary school mostly virtually, they had grown accustomed to navigating various platforms. What Noah shared shows that the change was gradual, or he was better prepared for these expectations, so it did not make him too uncomfortable.

Comfort and discomfort with the style of assessments was also a significant topic of discussion in all the focus groups. This was likely due to the first task requiring them to rank the four objectives in the subject, which directly link with the four assessment styles. While students in the case study school and other international primary schools struggled to recall whether they had assessments in primary school, those from the local schools stated that objective A: knowing and understanding was what they were most used to. These assessments tended to be given in a traditional test format of approximately 10 questions of increasing difficulty to answer. They therefore, mostly, spoke about it favourably, often referring to it as "easy" or the assessment they would most prefer to get. This will be spoken about more in the upcoming themes of purpose and transparency, but in the case of this theme, it was certainly what they were most comfortable with. However, what was spoken about more explicitly was their discomfort with other criteria. For example, Grayson, when talking about objective C: communicating and objective D: applying mathematics to real life said:

“And like, in my old school, we never actually did this before. So to me, it's actually very different from the other schools and C, we need to communicate with each other. So like, it's also kind of different from other schools, especially from the local school, local school, you won't um communicate your ideas, you just write the answer and then okay.”

While what was said was not explicitly negative, Grayson was making these comments while placing objectives C and D at the bottom of the scale as students ranked the objectives from best to worst. This negative response to the new elements within the objectives suggested a lack of comfort in the unfamiliarity.

Discussion

In this theme, students addressed that repetition can be comforting and help them regain confidence in their mathematical ability after their summer break or to reduce the attention mathematics needed so that they could focus their attention elsewhere. More generally, students shared that they felt more comfortable in experiences that were similar to what they had encountered before; however, this was primarily about knowing what to expect or feeling competent to handle something. Familiarity addressed these two concerns; however, new experiences could also address these concerns with transparency, which is discussed in a later theme, or scaffolding so that the step up was not uncomfortably large. This also helped to explain the comfort students felt when they believed they had moved into a less demanding environment than they had been in. This was not so much a small step up as theoretically a step down, but rarely with a negative view. This highlighted the role prior experience has to do with comfort during transition.

The discussion of comfort relates to students referencing a big step up in terms of volume, pace, and academic demands (Attard, 2012; Dickson, Perry, and Ledger, 2020; Symonds and Hargreaves, 2014; Visser et al., 2023) and how this can result in an environment that does not match their needs. Linking back to the first theme and the expectation of change, it is not

actually the newness that is uncomfortable but the trajectory to it. This emphasises the importance of continuity to keep the progression gradual.

Repetition of content was seen here as potentially offering comfort while contradicting the presence of continuity, with researchers viewing it as the breaking of continuity and sharing how this leads to disengagement (Ryan, Fitzmaurice, and O'Donoghue, 2021; Skilling, Bobis, and Martin, 2021). While the viewpoint of boredom will be looked at in a later theme, generally this shows that some researchers do not emphasise the perceived benefits of repetition as much as the potential negative implications. Instead, the findings here align with what Attard (2012) noted: students do not mind repeating topics and can recognise that, while the topics are the same, they often have a slight increase in difficulty. This emphasises the importance of a small step of advancement to avoid discomfort.

The perspectives of students affecting what they considered as comfortable was very much dependent on what they had experienced before with students' primary school contexts informing what was unfamiliar or unexpected. While in the first theme it was seen that some students expected more challenge, perhaps in curriculum or pace, the reference to assessments did not appear at this early stage. This suggested that certain styles of assessment were unexpected. Kaur, McLoughlin, and Grimes (2022) highlight how the incongruence between expectation and reality has a negative impact on engagement and motivation, so perhaps added to the list is the impact on comfort. While Anderson et al. (2000) suggested that low prior academic attainment may be an indicator of discomfort in academic settings, such as assessments, this was less prevalent than students' experience of assessments in primary school. This aligns with Walker and Lee (2018) who noted a gap in demands between the IB programmes suggesting that PYP students would have different expectations than those in the MYP.

Considering stage-environment fit, it is by definition that a mismatch between student and classroom would be uncomfortable (Pasca, 2014). The

environment not meeting the needs or expectations of the child would lead to discomfort, unless schools intervene. This intervention is suggested to be one that provides support and guidance while also facilitating the student to bridge the gap themselves (Visser et al., 2023). Within the MYP, this could reference the approaches to learning skill category of self-management, with the clusters of organisation, affective, and reflective skills within. In particular, the following specific strands:

-Plan strategies and take action to achieve personal and academic goals
-Practise dealing with disappointment and unmet expectations
-Practise dealing with change
-Develop new skills, techniques, and strategies for effective learning.
(International Baccalaureate Organization, 2014)

5.3.4 Students value purposeful and interesting learning experiences

Through the focus group discussions, students began to disclose their perceptions of valuable learning experiences and what they considered worthwhile investments of time and effort.

The first thought was that students wanted to know that there was a purpose for what they were doing in class. While the purpose was sometimes academic progress, as discussed in a previous theme, other purposes involved benefiting the student in the longer term or in other contexts, beyond the mathematics classroom. These discussions revealed some of the extrinsic goals of students as they shared which spaces in their lives, present or future, they were considerate of. The desire for autonomy also shone through, as students shared how they valued their time and energy and wanted to choose where these were directed, likely into an area they saw value in. At the same time, students shared that if the purpose was not clear, it was difficult for them to buy into the learning experience.

One of the most prominent discussions on this theme was the comparison of the usefulness of the different objectives in mathematics. This discussion

came about in the first focus group task: the ranking of the objectives. Many of the following points are shared by the focus group consisting of the students from the case study school. They chose to rotate their definition of “best” as easiest, most useful, and interesting resulting in multiple rankings and many valuable points of discussion. However, similar perspectives were shared across all focus groups.

A popular, almost unanimous perspective was that students saw the purpose for objective A: knowing and understanding. When ranking the objectives, most groups were quick to label A as the “best” despite the differing interpretations. When Harper was asked how she had made that choice so quickly she said: “it’s just in every single test possible”. Despite all four objectives theoretically being of equal importance, the consensus among the groups was that regardless of the task, knowing and understanding were essential. In this same conversation Noah said “they’re all knowing and understanding” and later “you need knowledge to communicate” referring to criterion C: communicating. Caleb meanwhile stated his reason for the high ranking as “it's something we're supposed to know. Like we're supposed to know about the math.” He struggled to communicate his thoughts clearly because to him this was the real “math”. Therefore, the purpose was obvious: it was mathematics class and, therefore, doing mathematics was purposeful. Generally, students saw experiences related to developing objective A as purposeful, as it would benefit them across all four styles of assessment and the general learning of the subject.

Similarly, most students saw a benefit for objective C: communicating. They shared how the skill of communicating is needed in other contexts such as group work, assessments, and their potential future work environment.

Noah: We have to. And we also, like, if we don't communicate, then only we can know it. Like no one else can know it.
Harper: If you work in groups, then you have to communicate
Caleb: And then in the future, you might work in a place where you need to communicate.

Noah: Yeah. And also, when the test, maybe explain why and explain your calculations.
Caleb: Communicating is pretty important.

This discussion was quite humorous to observe as the students were all in agreement and yet kept adding to the list how useful this skill was. They spoke about the need for relatedness and the ability to share their thinking with others and collaborate well. They also linked it to competence, or at least a means to reveal competence, both in school assessments and in a future work setting.

This acknowledgement of purpose relating to their future selves was also referred to when speaking about objective D: applying mathematics in real-life contexts. Noah started by stating “Criterion D is actually very useful”. To which Caleb tried to share the benefits of objective A but Harper abruptly refuted saying “not as useful as criterion D. We get to use it in real life.” The use of the phrase real life was frequently used both when referencing further studies and work contexts, but also when talking about daily tasks. This same group referenced their primary school mathematics homework to show the link to this criterion. They located their previous maths homework tasks which included “weigh 5 household items”, “calculate the cost of the meal and compare it when the receipt arrives", “find the best time to call family members in other countries”. This conversation only arose with this focus group, and it is important to acknowledge that they all came from a primary context with a focus on being inquiry-based, contextualised, and concept-driven, so this connection to real life was prioritised. In addition, they had all attended the same primary school, so they had this common experience.

Across all the groups, students struggled to see the purpose behind objective B: investigating patterns. In this objective, and the associated learning experiences, students had to identify patterns, make predictions, and generalise their rules, often algebraically. It therefore involved more abstract concepts than the other objectives.

One group was quick to demote this objective to the bottom of the ranking scale with very little discussion and was quite dismissive of any prompts to reflect on it more.
Caleb: but why criterion B. How is it useful?
Harper: It's not useful. It's not useful in any way.
Caleb: I mean, we don’t need patterns.

Another group initially felt a similar way but tried to approach it with an open mind and consider other perspectives.
Benjamin: on the other hand, maybe you need to do a puzzle…. or maybe because you're coding.
Freya: I think that B is one of the least useful in real life.
Grayson: Yeah. But it depends on what job you have.
Freya: Yeah. It depends, but like depends on what you're doing generally.
Aria: Like you wouldn't just go out and investigate patterns unless you're a math genius.

The use of the word "maybe" repeatedly when a positive perspective of the objective was shown emphasises the lack of conviction behind the statements and the weakness of the argument. Similarly, the shared use of the word "depends" insinuates that the students thought it may be valuable to someone, other than them. Despite looking for some value in this objective, all groups concluded that criterion B was ranked last, and a prominent factor was that they didn’t believe there was a reason for it. This belief links with the later theme of transparency. The fact that it is included and considered to be as valuable as the other objectives by the IB implies that there is a reason for it, but that purpose needs to be communicated more explicitly.

Students often evaluated the purposefulness of the objectives against “real-life” - either current everyday tasks or future careers. The connection to careers, despite their pre-teen age, highlighted the outcomes different individuals valued. Beyond the discussions of objectives, this link was still made with Aria referring to the future when sharing her perspectives in her start of year reflection about how she felt about mathematics this year. “I am

really excited to learn more about MYP maths because it is crucial to living a good life (picture of an arrow pointing to a dollar note and a house)". Her definition of "good" life appeared to consist of the security of finances and a home in the future. Aria's mention of future material possessions and Grayson's reference to jobs highlighted that students of this age were able to appreciate longer term gain beyond just the progress indicated by advancement in mathematics grades.

Finally, the reference to repetition showed its relevance again in this theme of purposeful learning engagements. This time, its value was decided based on whether students could see a purpose for engaging in it, either for their own wellbeing or that of their peers. When asked how he felt about the repeating of topics in units taught at the start of the year Caleb said:
"It, it makes me feel, it's basically making me think that, um, math is a waste of time." A waste of time illustrates that Caleb did not see repetition as a good use of his time or energy, so it was not purposeful. However, after engaging in a further discussion with his peers, Caleb began to understand that it could benefit some of his classmates and may support them in progressing. He also noted that being secondary students may also mean that they are in a better position to learn than when they were in primary school:

"They shouldn't be repeated, but, well, they kind of should because like, uh, maybe like back in primary, uh, the teacher might, um, explain it in a way that we wouldn't understand, but then now as we are of age that we understand lots of things. Um, I think it should be repeated. Just once or twice. Not a lot of times."

Here Caleb identifies a purpose for the repetition in that they are in a better place to understand than before. He initially placed responsibility on the teacher's explanation but then shifted to himself or his peers generally. He acknowledged the result of growing up, and the current stage of his peers, meant that they were more intellectually and mentally equipped than in primary school.

The other perspective on valuable learning experiences was that students were more likely to be motivated by engaging learning experiences.

One point about maintaining interest came from Elliot who made the point that mathematics lessons were longer in secondary school than primary which could affect engagement.
“Another difference I find is the time for classes. This is a big step up from what we’re used to. A lot of us have only experienced about 40 minutes, but for normal class we now have 55 minutes which is definitely a big change and it is influencing our maths in not the best way as a lot of us lose interest in maths a little bit into it. I think that’s mostly because not a lot of people like maths. But um I think that the overall time of the class makes it really boring.”

Elliot’s use of the phrase “big step up” again highlights the link to discomfort but his main point is the consequence of the change which is disengagement. While he does not attribute the entirety of the disengagement to the extended learning periods, he makes it clear that it is a significant factor. The phrasing suggests that a learning experience that has another focus than interest, perhaps being purposeful or leading to academic progress, is fine up until a point, but after an extended duration students need to experience something fun. Elliot goes on to say,
“I think that a way you could improve this is to add more things which catch our attention, for example a quiz”.
Quizzes were frequently presented as an example of a fun activity, and the students' use of the word referenced multiple-choice, gamified and online, whole class quizzes. The use of games and quizzes was supported by many students in the start of year reflections as a response to “what do you enjoy in mathematics” and “what helps you learn”. Though not expressed explicitly by students, quizzes link to a later theme of transparency and an earlier theme of progress as, when implemented effectively, they can be a valid form of formative assessment.

Other than games and quizzes, students found kinaesthetic learning methods appealing.

“In PYP before we could have a lot of materials, we could like walk round the school and like measure everything and we measured water and stuff like that. But like in MYP we just have to sit down and like just write our own stuff and like it’s quite boring to me.” - Darcie

At this stage the students had mostly experienced online learning so there had been a lot of independent computer work and reduced hands-on tasks due to restrictions. Even when they had been in school, there had been limitations on movement and group tasks, so there were reasons for this shift. Regardless, it is worthwhile noting that the hands-on projects were considered "fun" and more prevalent in primary school.

In line with the previous point about purposeful learning experiences, the real-life element again arose, but this time the feature of being purposeful resulted in enjoyment.

“Summative assessments often involve real life examples or problems and we would need to think about the limitations of our daily lives instead of doing the math which makes the summatives fun and interesting.” - Benjamin

As Darcie's point before showed, some students had looked at using mathematics in authentic contexts and found that enjoyable. That sentiment is repeated here even though the hands-on element was still not as prevalent. As a result, other attributes of these tasks may be seen as engaging. Potentially, the variety a project inevitably brings, or perhaps the ability to make meaningful links, leads to greater interest.

In the same way that it was sometimes challenging to pinpoint what made an activity interesting, it was also difficult to identify why something was not. Harper, who had remained strong in her conviction to keep objective B at the bottom of her ranking, concluded with:

“I just, I don’t like investigating patterns.”

This was in response to prompts to consider it from different angles and explain why. She struggled to find any other reasoning but was firm in the

fact that a lack of enjoyment and interest was a very real barrier that purpose and even a promise for progress could not overcome.

Still within the sub-theme of interest, the element of repetition arose again. However, this time, a case is made against repetition, saying that it does not make for an interesting learning experience.
“I found the fractions unit a bit boring at first because I thought that I’ve learned this already, I’m a master at this… (but obviously I was not. No one can be a master at math unless you’re insert some name of a maths prodigy here.)” - Aria

"In primary years I always was bored in class as I knew most of what was being taught." - Freya

From a wider context, it is later seen that both students were able to find value in perceived repetition by looking at it from a different perspective. Nevertheless, these initial contributions show that a lack of interest, or boredom, was a natural response to what felt like a purposeless activity. Connecting this to the other themes helps to better understand that both students regularly prioritised progress in their narratives and therefore an activity not explicitly supporting this progress lacked purpose. An activity misaligned with their values led to discomfort and a lack of enjoyment.

Discussion

This theme gave insight into what students valued in their learning experience. Purpose, in part, meant knowing there was a reason for what they were being asked to do. On the other hand, students had their own purposes that they prioritised, which affected how much value they prescribed to different events. Some students focused on the benefits to their future selves; others prioritised the immediate benefit of success in the subject; and others saw the purpose in gaining skills relevant for their daily lives and for other subjects. In other scenarios, enjoyment was prioritised with students highlighting the importance of variety, the implementation of games, and hands-on learning.

The reference to interest and its relationship with motivation, engagement and often attainment is present throughout literature surrounding the transition. This interest could be seen in the implementation of games, hands-on activities, and variety in learning (Attard, 2012; Visser et al., 2023). Furthermore, the connection between purpose and engagement can also be seen, with Corlu and Alapala (2015) noting that students enjoyed solving real-life problems more than algorithmic drills.

The reason for the different perspectives can relate to the discussion on purpose. That is, different students have different purposes. Skilling, Bobis, and Martin (2021) highlighted that a student who recognises a need for mathematics in their future career may be more motivated in class than one who has no plans to study it in the future. Outside of further study, Visser et al. (2023) noted that purpose for some students meant the ability to develop skills that were useful in other contexts, so again, depending on students' priorities beyond the subject, their definition of purposeful would differ. Therefore, the opportunity to pursue what they consider to be meaningful using autonomy, is an essential element of an appropriate environment.

These differing perspectives on interest and purpose provide some direction on how the MYP framework could be implemented to support this. The interdisciplinary opportunities (Perry, Ledger, and Dickson, 2018) mean that students are theoretically encouraged to make the links to what they view as purposeful, which can be further individualised through authentic inquiry learning. Having this range of trajectories rather than a prescriptive track for all students (Chambers and Coffey, 2018) gives students the opportunity to engage in what they enjoy or are good at (Doerr, 2020). However, there are limitations to this. Firstly, some things, such as the objectives, are compulsory. Secondly, students need to be supported in pursuing lines of inquiry independently. These are just two considerations that need to be made ahead of any recommendations.

5.3.5 Students value transparency as support

The theme of transparency speaks to the need for wanting to know what to expect. As students at the start of adolescence, this plays to their need for autonomy. It also responds to students referencing the fear of the unknown which highlights that making things known can remove much of that fear.

Ahead of the transition, this links to the theme of expected change as transparency can better inform that expectation. Once in secondary school, it also connects with the theme of making good progress as students are clearer on next steps at each stage of their learning journey. This section will look at transparency in the context of the initial transition and then also within the learning experience.

Transparency ahead of transition can maintain expectations

A lack of transparency ahead of the transition meant that students constructed their own expectations. Aria shared in her video narrative her expectations of MYP Mathematics:
“I was very fearful that there would be algebraic equations all over the place…I thought secondary was this whole unexpected unknown world where you just learn really hard equations like Albert Einstein”.

Aria felt negative responses to a fictional scenario because there was limited knowledge to base a more realistic prediction on. She goes on to share relief “but it was actually the first few weeks were almost a repeat”. Therefore, transparency about what the first few weeks were going to look like may have allowed her to avoid this feeling of negative anticipation.

Isla shared in her start of year reflection “a bit nervous because I don't know how maths this year is going to be like”. Again, the apprehension came from not knowledge rather than a fear of what was known. While it was seen in the theme “change is expected” that some students knew, or at least assumed that the subject would be challenging, this knowledge did not cause as much

negative emotion as not knowing what was to come did.

It was evident that students were not given accurate information about what to expect from the school itself. Expectations were based on assumptions, skewed perspectives from the work of siblings or stories and brief glimpses into the context. This suggests that either explicitly communicating the expectations or providing a forum to answer students' queries and clarify misconceptions, could have avoided a lot of unfounded anxiety.

Due to COVID-19, students missed the opportunity to experience a taster day, but even in this, they will have only experienced 45 minutes of mathematics. It is questionable how reflective it would be of the true environment rather than the highlights associated with the programme.

Ongoing transparency can reduce anxiety

Even after the transition had occurred, students expressed the need for transparency to be ongoing. A part of this was students wanting to have ownership over their learning and a desire for autonomy. If they were unaware of what was expected of them or how best to reach this, they could not make informed choices about how to organise themselves.

Elliott shared one specific aspect of transparency surrounding homework. He highlighted the fact that students had come from a setting where one teacher was responsible for all homework and they could therefore streamline the process to access it. Whereas, in secondary school, while the school had systems in place that were essential to use, it was up to individual teachers if they wanted to add additional sources. Elliott initially shared that homework in general, in quantity and range, was challenging. However, as shared within the theme of comfort, he specified that in mathematics “I think you could improve this by lessening the platforms we use so we can more easily find our homework and keep track of it”. After listing the platforms used already at this point, he ended with “so sticking to one would be very appreciated.” This element of transparency was less about providing insight

and more about clarifying or simplifying. Elliot was clear that there was homework to be done and was not concerned about the rigour of the actual task. He just wanted the process to get started to be made simpler.

All students appeared to agree with the need for transparency in assessments. Assessments were a new experience for most students, particularly those who had experienced primary education in an international school setting. Even those who had completed tests that had been marked or reported upon had not experienced the style of assessments that were presented in the MYP.

Again, Elliot shared how transparency would be a crucial support in this area. When writing at the start of the year within the “what helps you learn” section of his reflection, he wrote: “an easy “test” that doesn’t affect anything and is just used for practice”. A practice test offers clarity for what to expect and allows students to identify their progress towards success in the final assessment. The point about it not affecting anything heavily suggested an unreported grade, or no grade at all. Students wanted to know what was coming up and how they would currently perform. Elliot placing this in the “what helps you learn” section also implied that this was not an end point. Students, or at least he, would be informed of this and take the relevant steps to progress if he was not satisfied with the result. Although he uses the word easy, for it to be truly transparent, it would need to reflect the rigour of the “real” test, otherwise it may not fully support preparedness. However, this may not have been a priority for Elliot as perhaps even an “easy” test could offer some insight into what to expect. Ease may also mean a shorter, more frequent tests, presented in a quiz style, in reference to his previous suggestion of more gamification. Conversely, the ease could be due to the lack of a grade or through the provision of additional structure and guidance.

Olivia elaborated on the point that assessments in general were a new experience to her, particularly the investigations and real-life tasks. She too appreciated the clarity and low stakes nature afforded by “practice tests”.

“For secondary, I noticed that there would be a bunch of new tests. In my old school we didn’t really do tests that much and so we mainly would learn about the subjects and topics related to criterion A and criterion C but we didn’t really do that much criterion B or criterion D. So, the formatives they helped me understand what the tasks would look like and what I could expect.”

Her mention here of “formatives” were the tasks usually carried out a few weeks ahead of the final assessment. The aim was for students to experience the criteria strands and receive feedback against them; however, to keep the summative assessment rigorous, the same content was not assessed. This meant that the formative assessments were not enough to offer complete transparency.

Students offered more insight into what supported transparency within the focus group discussions. One of the questions used to prompt the ranking of objectives was “if you were told you had an assessment in one of these objectives tomorrow, or next week, which would you be most/least comfortable with?”

As mentioned previously, students often ranked objective A as “best” and this was another reason for it. The focus on knowing and understanding meant that, despite there being a challenging and unfamiliar section, students knew how to prepare for it by reviewing content seen in class. They also knew how to access resources if they wanted more practice or support.

Freya: "Well, criteria A is like what you learned in the class and you're gonna do it. Cause like, you know, what's gonna come up basically. My opinion. I, I prefer criteria a cuz it's more straightforward."

Aria: "Yeah, me too. I mean, criteria A has like a real, a right and wrong answer."

Caleb: "I choose A, because like, um, you give us the knowledge, like we already have the knowledge in some sort of way."

While the comments differed, here students were validating each other's viewpoint that for criterion A, and the associated assessments, it was clear what it would look like, and what they would be expected to do. This is partly because there was a wealth of resources to help students prepare as tests like these were not exclusive to the MYP framework. However, it was also due to its familiarity. While not all students had experienced mathematics tests in primary school, this most similarly mimicked quizzes or traditional homework, which they would have most likely encountered at some point within their education or outside of it.

In contrast, when discussing the other criteria, students used language that suggested the opposite: a lack of clarity.
Noah: "criterion D goes in the bottom if we don't know anything about."
Here, Noah is referring to the authentic scenario students were often given in criterion D tasks. As these assessments were sometimes in the context of on demand tests, and sometimes longer-term projects, students' responses to them differed. Noah was contrasting the difficulty encountered when having to process a completely new scenario in a short time frame requiring strong information literacy skills to unpack the problem before even getting to the application of mathematics skills. This lack of transparency, therefore, is how students are expected to transfer their skills.
Cason: “while like B, D and C, we have to like, expect the unexpected.”

Another issue related to transparency of assessments was what the criteria meant and how they were assessed.

Aria: Like investigating patterns… you just don't know…like there could be a right answer…
Freya: There could be multiple.
Aria's impression that there might not be a correct answer showed confusion over the purpose of the assessment as there was always a correct answer. However, as it was an investigation, the intention was that there were multiple ways to reach the "correct" rule, which even then could be presented in multiple forms. This suggests that the openness of the task itself resulted

in a lack of transparency. This has broader implications, as one of the key components of the MYP framework is inquiry, which lends itself to creative approaches and various levels of structure.

Discussion

The theme of transparency was one of the more prevalent themes through literature. Transparency ahead of the transition was more so a means to familiarise students with what was to come and reduce anxiety (Chambers and Coffey, 2018; Visser et al., 2023). This is very much linked to the first theme of “change is expected” but is less relevant to this study than the ongoing transparency discussed. However, much of the reasons for the pre-transition transparency are transferrable to post-transition.

The desire for transparency was seemingly universal with all students valuing that additional clarity. However, the misconception about inquiry suggests that those who have not experienced it before may need additional clarity. It is worth noting that students from PYP were also confused regarding this, which supports Walker and Lee’s (2018) identification that part of the issue comes from teachers not understanding or expectations being different across the programmes. If those meant to be providing the transparency are themselves not clear, this suggests the transparency is not being provided from the top down. This is supported by Bunnell (2011) who identifies that there is a perceived lack of clarity within the curriculum materials provided by the IB, which leads to a perceived gap in support for teachers (Perry, Ledger, and Dickson, 2018).

While this gap is unfortunate, the flexibility afforded through the MYP does provide space for schools and teachers to clarify the other documented issues, such as the jargon and assessments (Bunnell, 2011). Richter et al. (2019) share that the role of effective communication and administrative procedures can counteract unclear expectations and a lack of information. Therefore, systems implemented by a department can establish the clarity desired by students by essentially filling the gap with explicit definitions, formative assessments, and other tools as requested through student voice.

5.3.6 Students are affected by others

This section sheds light on how students perceive the impact of others—peers, family members, and teachers—on their transition experience. This theme is closely interconnected with prior themes and will therefore incorporate these in the context of three relationships: teachers' potential to offer support or hinder progress, the role of peers in adding enjoyment and support or causing discomfort, and the influence of family members in providing transparency and support for progress.

The impact of teachers

Students often acknowledged how teachers could utilise their role to create engaging learning experiences.

“...quite fun because the teacher arranged a lot of activities for us to do” - Darcie

“It was fun because the teacher taught us in a fun way” - Elliot

The use of the word "because" shows that these students both attributed the fun directly to the actions of the teacher. This insinuates that regardless of the student’s association with the subject, the construction of their experience was significantly affected by the person organising the lesson and the components they chose to involve. As the aim of the study was to identify how a teacher can facilitate a successful transition, it is reassuring that they can make a significant contribution in this way.

Beyond fun, other students spoke about the role of the teacher in making the learning experience more productive and helping their learning to progress:

“I was really happy when Ms C became my teacher as she always gave me advanced work to do.” - Freya

As shared in her individual narrative, Freya’s construction of transition had several turning points that centred around her desire for challenge and progress. She shares here the contribution a teacher could make in meeting that need. When Freya perceived that she was making progress at a pace she was comfortable with, she was content. She was therefore appreciative when she was set apart from her peers and given specialised tasks.

However, students also shared how teachers could have a negative impact on not only their academic progress but also their emotional wellbeing. Speaking as to why repetition may be needed, Caleb adds some background from his primary school experience:
"The teacher might, um, explain it in a way that we wouldn't understand".
Similarly, Benjamin shared about the same stage:
“The teacher grabs the explanations from the book and says there’s the question, go figure”.
“The teacher always gives you the worst feedback…you did that wrong…that was easy, why didn’t you get it correct. Ugh PTSD flashback”.
“The most horrible part of the maths test is not the test itself, but the teachers. The way they comment on your work”.

These comments show how a teacher's active choices, such as their explanations, feedback, and resources, can have a negative impact on areas of wellbeing. However, sometimes the lack of action has the same effect.
Headline: "Teachers not organising leap to Year 7 leading to high levels of stress and anger" - Elliot
Here Elliott shows that he expected his teachers to do more to facilitate the transition; their perceived inaction was seen as a lack of support.

Generally though, students were positive about their interactions with teachers in secondary school and recognised that they had a positive impact on their wellbeing.
“The teachers are really kind and supportive.” - Aria
“The teacher actually interacts with us” - Benjamin
It would be naive to think that my role as teacher-researcher was not a factor in potentially shaping what students chose to share. However, the presence of less than positive viewpoints shared at other points supported the perspective that students felt comfortable being honest with their comments.

The impact of peers

The first finding was that peers could enhance enjoyment and support progress. This could be seen in response to the prompts on the start of year reflections. Towards “what I enjoy in mathematics”, six students said they enjoyed group work, with Aria specifying group work with friends. In reference to “what helps me learn”, two people mentioned sitting with someone who is “good at maths” and three mentioned friends. This distinction between classmates and friends suggests that peers can offer various things. Some students saw others as beneficial for their progress within the subject, speaking to competence. While those who referenced friends were likely speaking to their need for relatedness - working with someone they felt safe with and who they would feel comfortable asking questions to.

However, the same prompts led to seemingly opposing viewpoints. Three students said that they enjoyed working alone or independently while six students said that working alone or in a quiet space was beneficial for the learning. What is even more interesting is that these diverse viewpoints often came from the same student. For example, Aria said that working “with friends” helped her to learn and said in response to what she enjoyed “I like doing group projects with my friends, but sometimes I like to take charge and be independent.” Kai had said he enjoyed group work, but that silence and friends helped him to learn. These mixed viewpoints can be viewed in different ways.

Firstly, enjoyment and learning may not be as clearly linked as suggested in the theme “students value interesting learning experiences”. Students shared that what they like in the classroom is not always what is best for their learning. Darcie made the clear link between enjoyment and friends within her video narrative: “...a lot of fun. You can still communicate with your classmates if you’re not online”. While Aria linked enjoyment with ease, highlighting how friends could create a sense of comfort as she referenced her primary school experiences: “but that’s why I was really missing primary because I was thinking oh my gosh prep is such a breeze, I could talk to my friends in math and I wouldn’t do any math outside of school.”

Another consideration for collaborating to meet the need for relatedness rather than competence is that students may feel a sense of safety being amongst their friends, even if they are then working silently. Similarly in group work, there was a sense that this was a gentler way to learn as many people were contributing. However, when it came to strengthening understanding or practising, an independent and a productive environment was preferred. This offers the additional perspective that what they perceive as beneficial to them, whether for enjoyment or learning, changes depending on the day, what they are learning or how they are feeling.

The potential hindrances of group work are also linked to the second point of peers affecting one's level of comfort. As their most recent assessment at that point involved redesigning a wallet and presenting this design to their classmates as a combined communication and real-life problem task, a few points about their peers emerged in a discussion around this. One point was the tension within group work - navigating having their own strong ideas but having to negotiate them with others. Mason shared "sometimes not everyone has the same ideas…. when we're doing the presentation. We prepare the presentation and we talk to each other, but we do not have the same ideas." This highlights the need to collaborate as success, in this case, was not an individual effort. Particularly in a creative task such as this when there was no single solution, students had to come to a consensus to move forward.

In reference to the same task, a second group had a discussion that focused more on the presentation aspect and how they believe they may have been negatively perceived by their peers. Noah said he wanted to rate communication tasks low on the ranking "because we literally have to embarrass ourselves…. criteria B and D we're only embarrassing ourselves to one person". Harper went a step further and said that the experience was more than just embarrassing "for something we don't know anything about, it's so scary".

Feeling shame or fear from having to present in front of classmates, and a teacher, shows how there is a lack of feeling competent. This is amplified by Harper's reference to "something we don't know anything about". This connects to the theme of transparency as this would allow students to feel more prepared ahead of the presentation and increase their sense of competence. In addition, these comments indicate a lack of security and a limited sense of belonging which connects to relatedness. All of this highlights the need to create a safe environment and supportive culture so that students feel empowered and not judged by their peers.

The impact of family

The discussion around family fell primarily into two claims: offering perceived transparency into the change and offering support for good progress.

For the former, students shared that their expectations of MYP Mathematics were partly based on what they had seen or heard from older family members who were slightly ahead of them in school. Within his video narrative, Kai shared "I thought secondary math would be really complicated and hard because I've seen my cousins and sisters work". Here Kai expresses that he drew on multiple sources to draw his own conclusion. His language suggests that he drew that conclusion himself based on what he saw, and perhaps did not consider that he would be looking at content a few academic years ahead of him. The choice of language and what was shared by Kai at later stages also show that his expectations were incorrect, as he was able to learn what he initially categorised as complicated and hard.

Elliot shared the same view point, but prior to experiencing the new learning environment, on his start of year reflection. He similarly believed that the mathematics would be more challenging, but based on the perception of someone else, his brother. In his start of year reflection, he wrote "I think it is going to be more challenging and fun because my brother talks about how hard some parts of maths is". This was written after he expressed that he found mathematics in primary school fun but easy. The input of his brother affected his perspective on the level of rigour of mathematics rather than the

feelings associated with it, which remained consistent as “fun”. The association of ‘my brother found it hard so I will too’ shows the strength that relationships can have on expectations as Elliot reached this conclusion without referencing the work itself, just his brother's perception of it.

The role of family was also seen to be significant in supporting good progress. Both in terms of supporting learning in primary school as well and in the new context. When responding to “what helps me learn” on the start of year reflection, Isla wrote “sometimes my mum”. When asked about this, Isla clarified that her mum used to help her with her homework, but occasionally the mathematics was too hard “even for her”. This suggested that as Isla encountered higher levels of mathematics, she became aware that she would be able to rely on support from her mum less, in terms of learning and understanding content. In addition to this, some of the students from local schools often commented that the techniques used in the international school setting differed from how concepts were taught in the local schools, so the way their parents learned did not align with the processes the students use. This gap would likely widen as students progressed, as indicated by her use of sometimes.

Elliot also referred to family in his video narrative. In this case he was explaining how his dad encouraged him to practise more when he encountered challenges in the subject. “Maths is getting quite hard so personally I am finding it quite hard also. For a little bit it was quite good as my dad did make me go to do some extra maths work so that has helped a lot. But I understand that not everyone has done that”. This shows that parents can play a role other than teaching or explaining, as Isla’s mum did. Instead, Elliot’s dad helped to direct his own learning process, understanding that his role may be more of a facilitator than a teacher.

Freya and Benjamin showed yet another perspective on how parents can be instrumental in the learning process. In Freya's narrative, her parents were additional advocates for her desires and were proactive in seeking advice from multiple educators. While in Benjamin's story, he shared that part of the

reason he was content with the pace of learning was because his dad was introducing him to higher level concepts at home. Benjamin's most animated reference to his dad was when he expressed how grateful he was when he had pulled him out of his previous school. As seen earlier, one of Benjamin's key values was to be comfortable. Therefore it was logical that a parent acting on this key value would evoke a greater response than reference to academic progress, which he did not appear to value as much at this stage.

Discussion

Relationships were one of the most discussed themes in transition literature with the role of supporting people being key, both pre- and post-transition. While the distinction was made between the people involved in the crucial relationships within this section, the general appreciation of a strong network is identified by Waters, Lester, and Cross (2014): “students who expect and experience a positive transition to secondary school are generally well-supported by their peers, school, and family.”

The narratives surrounding the teacher role were particularly beneficial for the aims of this study. The teacher-student relationship was made clear in both Benjamin and Freya’s narratives in ways that echoed the literature. Benjamin noted the benefits of a good relationship (Attard, 2012) while also recognising the potentially damaging implications when there was a disconnect (Spernes, 2020). Freya highlighted the role a teacher’s enthusiasm and subject knowledge (Mudaly and Sukhdeo, 2015) had in promoting enjoyment (Visser et al., 2023). Furthermore, the individualised guidance provided by a teacher was seen to be an invaluable support (Skilling, Bobis, and Martin, 2021). The contribution to the literature in this aspect is that relationship building can be content focused. This is partly suggested by Paul (2014) who mentions the benefit of teacher-student pedagogical relationships in designing appropriate supports. However, generally, transition research frames the shift from one primary teacher to multiple secondary teachers as negative, in part because these teachers are more content-focused than nurturing (Bru et al., 2010). The findings in this study show that these two traits are not dichotomous and that having the

strong content knowledge to effectively adapt to an individual's needs (Kaur, McLoughlin, and Grimes, 2022) is appreciated by students as a form of support.

Perhaps surprisingly, less was said about peers than expected based on the literature surrounding peer connections. This was likely due to the focus on an academic subject, rather than the social or emotional support often referenced in relation to positive and negative peer relationships. This supports Attard's (2012) thinking of the individualistic nature of mathematics lessons and learning. Nevertheless, some students enjoyed the flexibility of working with peers (Skilling, Bobis, and Martin, 2021) or at least asking their friends for support which highlights the sustained desire for connection and belonging (Hassard, Pendergast and Hay, 2024).

Parents were often referred to as a resource rather than a relationship. This is despite Bagnall, Skipper, and Fox (2020) suggesting that students were less likely to ask parents for support after the transition, and more likely to go to siblings or peers. However, this may have cultural or contextual significance. As an international school, the frequency of parents supporting or hiring a tutor to help (Corlu and Alapala, 2015) and the parental focus on academic rigour (Walker and Lee, 2018) may mean that this shift is less prevalent.

The interaction of the MYP and relationships can be considered from a few perspectives. With regards to peers, the ATL skill of collaboration highlights the value of others and their role in one's learning. However, students identified that this is not always the case and therefore, again, the case for the ATT element of differentiation and flexible learning comes to the forefront. Flexible spaces and groupings as suggested by Skilling, Bobis, and Martin (2021) could potentially meet the ever-changing needs of who students want to work with, but with that comes the reflection of what consequences this could have on classroom management. So again, students would need to be supported in making the right choice.

Furthermore, while not explicitly shared here, it was seen that Benjamin felt most comfortable expressing himself around students from similar backgrounds during the focus group. This makes a case for the cultivation of an internationally minded classroom, but raises the potential separation of students by language or background. It is perhaps this consideration that leads to the contradiction as to why home languages are theoretically allowed but not promoted in the classroom (Buntsma, 2023).

Chapter 6 - Conclusion

6.0 Introduction

This study aimed to explore the experiences of students transitioning into the International Baccalaureate (IB) Middle Years Programme (MYP) mathematics course in order to answer the following research questions:

1) How do students construct their transition to MYP Mathematics?
2) What factors affect how students experience the transition to MYP Mathematics?
3) How can the MYP framework be adapted or implemented to support the transition to MYP Mathematics?

This chapter will answer these questions and then highlight the study's original contribution to knowledge before addressing the limitations of the study and suggesting recommendations for further research.

6.1 Answering the Research Questions

6.1.1 How do students construct their transition into MYP Mathematics?

Almost every narrative began with an expectation that there would be a change, in self or in environment, through the transition. Stage-Environment Fit (SEF) theory aligned with this as students were either questioning if they, as a developing individual, would adapt well to the new setting or if the environment, their new secondary school, was suited to their needs in comparison to their primary school. The strong match or mismatch of their perception of self, which is developed during adolescence (Topping, 2011; Wigfield, Lutz and Wagner, 2005), to certain environmental elements resulted in several areas being significant enough for students to mention.

In many cases the expectation focused on the increase of challenge within the subject, seemingly a common stance for year 6 students (Attard, 2012;

Doerr, 2020; Eskelä-Haapanen, Vasalampi and Lerkkanen, 2020). Often students positively anticipated this challenge, viewing it as an opportunity to progress academically. Other times, the assumed challenge brought some trepidation, but this was in part due to not knowing what to expect.

The mixed perspectives were very much reflective of findings within transition literature (Hodgkin et al., 2013) which identified that some students view change and potential challenges as opportunities (Doerr, 2020; Skilling, Bobis, and Martin, 2021) while others have negative feelings towards the loss of familiarity (Ashton, 2008). For the students who spoke positively about change without indicating the academic challenge, there was more likely to be an assumption that this transition would also bring about a change in self. This aligns with Symonds and Hargreaves (2014) analysis with SEF, where students shared that they saw post-transition students as more mature.

As students experienced their new environment, there was a spotlight on continuity and comfort, particularly for those who recognised the reality as very different to their expectation. This differed to the big step referenced in literature (Attard, 2012) which focused more on tangible changes between primary and secondary school. Discomfort here was instead due to unmet expectations, which were constructed largely on the unknown.

In general, students did not truly know what to expect and therefore the meeting of reality either resulted in relief (better than predicted), disappointment (worse than predicted), excitement (positive outlook met) and, very rarely, worry (negative outlook met). These spectrum of outcomes somewhat contradicted Carmichael's (2015) perspective that negative outlook could lead to self-fulfilling prophecies and Waters, Lester, and Cross’s (2014) finding that a positive taster day could lead to a more positive transition, even if the taster day was not reflective of the typical environment. These imply that expectation largely informs experience; however, this study suggests that this is not the case and that these two can differ. This suggestion has its limitations. Due to the lack of data captured at the start of

the transition, and certainly pre-transition, it is challenging to know how reflective these findings were of students' true expectations. It is possible that collecting this insight during the first mathematics lesson, rather than the first day of secondary school, had already given students time to re-inform their expectations.

The first few lessons were found to present topics which many were already familiar with from primary school, though the style of teaching and learning was often new. The concept of repeating content was received in very different ways. For some students it provided comfort, while for others it represented a stall in progress. Some were disinterested, while for others it felt purposeful to review in greater depth. These perspectives mirrored those found in literature with Skilling, Bobis, & Martin (2021) identifying it as unstimulating while Attard (2012) noted that some students viewed it positively.

During the final stage of the transition, students started accepting and, if necessary, adjusting to their reality. This period of settling was comparable to the end of the phase which Booth and Gerard (2012) referred to as the "honeymoon effect". However, in their case, students' attitudes declined at that stage, whereas in this study there were cases of a more satisfied temperament compared to earlier in the transition. This satisfaction may have been due to students adjusting their needs to suit the environment rather than the other way around. This potentially demonstrated the coping skill of adult conformity described by Anderson et al. (2000) which may seemingly support a student's transition by reducing friction, through prioritising the opportunities available in the adult structured environment.

Throughout this construction, the key elements that students chose to share developed into the themes discussed in the previous chapter. Further analysis of the more general and collective experience of these themes will be included as response to this research question, while divided perspectives are more applicable to the next.

Generally, all students valued transparency, as this could reduce anxiety (Chambers and Coffey, 2018). This was relevant ahead of transition but was also ongoing through the clarification of assessments, particularly criteria B (investigating patterns) and D (applying mathematics to real-life contexts). They appreciated transparency in the form of formative assessments and feedback which allowed them to evaluate their academic progress. These opportunities for teacher and self-assessment met the needs of competence and autonomy. Students wanted to feel competent in their role as a student, but also wanted enough support to be able to move themselves forward, a balance referenced often in literature (Athanasiou and Philippou, 2008; Eccles and Roeser, 2009; Visser et al., 2023).

Students also indicated that learning experiences needed to be purposeful. While Kaur, McLoughlin, and Grimes (2022) found that students were less engaged with inquiry-based learning post-transition, this study adds the perspective that the type of inquiry is a factor. Particularly whether the inquiry feels purposeful or not, as purpose can be a driving force for engagement (Chambers and Coffey, 2018). During the focus groups, students struggled to discern the purpose of criterion B, tentatively associating it with coding or a "maths genius" solving puzzles. This perceived weak sense of personal purpose suggests framing criterion B as tending towards theoretical inquiry, rather than completely towards the practical, "hands-on" problem-solving focus, which criterion D is closer to (Corlu and Alapala, 2015; Deieso and Fraser, 2018).

Comfort was often linked with familiarity, as was seen with student responses to the four assessment criteria. This implied discomfort in the unfamiliar which was commonly framed in literature as discontinuity in the form of change in structure, environment and approaches, and was seen to cause declines in motivation and engagement (Carmichael, 2015; Paul, 2014; Prendergast et al., 2019).

Comfort was also responsive to the involvement of others. Students shared that working with friends, a mathematically strong peer and in a group could

sometimes support progress, add a fun element, or provide comfort. While Bharara (2019) mentions the potential academic benefits of working with friends, literature mainly focuses on the sense of belonging provided through relationships (Hassard, Pendergast and Hay, 2024; Holt et al., 2022; Mowat, 2019), prioritising the need met of relatedness. At the same time, students were able to identify the benefit of working independently and shared some of the negative perspectives of working around their peers - tensions in collaboration and a feeling of awkwardness when presenting.

The role of adults was also significant in this stage of settling. Parents supported progress through teaching, facilitated systems to support learning, and advocated for their child. In this study there were no negative reflections about the role of parents which may be due to the affluent nature of the context. This is supported by Anderson et al.'s (2000) who noted that students from lower socio-economic backgrounds often struggle due to a lack of parental support. Corlu and Alapala (2015) highlighted that the higher level of parent support in international schools with wealthier populations, either directly or through a tutor, aided positive transitions.

In this final stage of the transition, there were only positive comments regarding teachers as well; however, there are limitations to the legitimacy of this due to the teacher as researcher position. Nevertheless, students shared that the teacher could make a large difference in their enjoyment by creating engaging, purposeful, and diverse learning experiences which Wang (2012) connects; meaningful learning results in interest. Others highlighted the importance of being known by the teacher, which was shared in literature as being more common in primary school (Bagnall, Skipper and Fox, 2020; Bru et al. 2010; Spernes, 2020). However, the presence of this pedagogical relationship in secondary school supported the development of personalised learning experiences. This student-centred approach was identified as better equipped to meet the changing needs of adolescence than a teacher-directed one which devalued competence, removed autonomy and was less conducive to relatedness (Schweder and Raufelder, 2024).

6.1.2 What factors affect how the transition is experienced?

Primary school experience and context were factors which seemed to affect how the transition was experienced. Literature attributes this to the extent to which primary school teachers prepared the students. This ranged from a lack of preparation or even misinformation (Mumford and Birchwood, 2020; Visser et al. 2023), to a focus on academic preparation (Visser et al., 2023), or giving students a chance to meet peers and teachers ahead of transition (Doerr, 2020). However, students in this study rarely referenced their primary school teacher when constructing their experiences. Instead, their level of comfort in the new environment relied on their primary school experiences, their expectations, and their level of competence. While literature focusing on the transition into the MYP addressed the misalignment in the continuum (Buniel and Ravichandran, 2018; Bunnell, 2011) this study provided perspectives from non-PYP primary contexts as well.

Those who studied in the primary sector of the case study school had a slightly more accurate insight into what to expect, although by no means complete, but this did not appear to be a protective factor when it came to their perception of assessments. Here, all students seemed apprehensive of the investigations and real-life application tasks despite one focus group from the case study school identifying that they had addressed these objectives before.

Instead, what was more prominent was that the students who had attended local Hong Kong primary schools were less overwhelmed by the assessments and homework, as the demands appeared relatively lower than in primary, even though the style of assessment was often completely new. This is an area that does not seem to be discussed in transition literature involving international classrooms, with the focus often being on language affecting communication (Buntsma, 2023; Corlu and Alapala, 2015) and cultural conflicts (Corlu, 2013). While assessments were only one component of the transition, this finding contradicted others which suggested that non-PYP students were more likely to struggle (Dickson, Perry, and Ledger,

2020) and that gaps in pedagogical approaches added to the difficulty (Buniel and Ravichandran, 2018). However, Walker and Lee (2018) suggest that cultural priorities may play a role in this; perhaps the perceived ease of adjustment was due to a narrower focus on this area of assessment rather than on peer relationships or wider learning skills.

Prior attainment and confidence in the subject were also seen to play a role, as this affected what could be a comfortable step, what was purposeful, and what was considered progress. Attainment is discussed in literature as Visser et al. (2023) indicated that higher attaining students were more likely to positively anticipate greater challenge and were more likely to prepare for it (Skilling, Bobis, and Martin, 2021). Meanwhile, Anderson et al. (2000), suggested that lower-achieving students had a less positive outlook on the likely struggle. However, academic preparedness was not completely considered to be a protective factor (Harries and Tennant, 2012), particularly if discontinuity occurred. This could be seen in the varying responses to repetition, with some students appreciating the opportunity to revisit these concepts while others found it boring and a waste of their time. Nicolescu and Petrescu (2015) contributed that the reasons for these differences in perspective towards repetition was partially attributed to mindset.

A student's ability to take a holistic perspective on learning played a significant role in motivation and engagement. This was seen in some as a pre-existing trait. In others, an appreciation for the learning journey, the progression from knowledge to understanding, and the ability to evaluate progress beyond content advancement were able to be taught and developed. The reference to mindset and personality attributes as potential protective factors for the transition is addressed widely (Beatson et al., 2023; Doerr, 2020; Anderson et al., 2000; Bharara, 2019) with the inclusion of resilience, self-regulation, and reflection as key traits.

There was some indication that having older siblings provided some insight and therefore supported the theme of transparency, helping to make the unknown, known (Lucey and Reay, 2000). However, this was only really

referenced ahead of the transition. Within literature (Visser et al., 2023), siblings were more often referenced as an emotional support or contributing to the transitioning students' sense of belonging (Anderson et al., 2000; Bagnall, Skipper and Fox, 2020; Bharara, 2019; Doerr, 2020; Rodrigues et al., 2018; van Rens et al., 2017). Instead, students in this study were more likely to reference parents; supportive and present parents were seen to be better equipped to handle some of the challenges faced through the transition period. In such a small-scale study this is perhaps unsurprising as only a few students had older siblings.

Finally, students' personal priorities affected what motivated them in the classroom and how they responded to the experiences during the transition period. For those prioritising comfort, flexible seating was appreciated. For those who valued fun, variety, hands-on learning or authentic problem-solving was preferred. Those whose purpose was aligned with academic progress appreciated transparency regarding assessments and homework. Some students appreciated an autonomous path that they could direct, while others were trusting in the process that the teacher's lesson design would get them to where they needed to be.

Therefore, the only common factor which supported transition in this case, was whether each student's motivation was identified, and the extent to which it was addressed. Despite this, even in one student, the primary factor of motivation could change from lesson to lesson, so an ongoing discourse was needed to maintain effective teacher influence. These evolving and diverse needs appear to be appropriate for the stage of adolescence as students tune into their sense of self (Symonds and Hargreaves, 2014; Wigfield, Lutz and Wagner, 2005). As long as these needs are met, students remain motivated (Pasca, 2014) and, despite the diverse nature of the needs, Aldridge, Blackstock and McLure (2024) suggest that they can be met in a single environment if certain elements are considered. These are safety, community, academic atmosphere, and institutional environment. A consideration of these elements informs the recommendations to follow.

6.1.3 How can the MYP Mathematics framework be implemented to support students post-transition?

This question sought to identify which of the factors from the previous questions could be addressed by implementing certain components from the MYP framework. Fortunately, the flexibility of the framework allowed many areas to be encapsulated.

The theme of valuing transparency was prevalent both in the students' narratives and in literature. Specifically, students wanted to feel prepared for what was to come (Evangelou et al., 2008), both ahead of the transition and through it. Therefore, the first recommendation is to create systems that enable students, and supporting parents, to have as much insight into the learning journey as possible. The need for this is evident throughout literature surrounding the perceived weaknesses of the MYP, specifically the unclear jargon (Cochrane, 2017) and the lack of clarity surrounding curriculum materials and assessments (Bunnell, 2011; Perry, Ledger, and Dickson, 2018). In regards to elements of the framework, schools could take advantage of the flexibility and not introduce all the elements to students immediately, thereby minimising the overwhelm often experienced in transition (Mumford and Birchwood, 2020), particularly by students who did not attend a primary school following the Primary Years Programme (PYP) who are likely even less familiar with the terminology (Dickson, Perry, and Ledger, 2020). Furthermore, simplifying jargon into student-friendly language and using exemplars can offer additional clarity.

With students placing a lot of emphasis on assessment, perhaps because of cultural priorities (Walker and Lee, 2018), this is a particular area of consideration for transparency. Utilising low-stakes formative assessment, perhaps in the form of quizzes or games, could support them in receiving feedback regularly, an interaction valued by students (Visser et al., 2023), in a less intimidating way. Furthermore, transparency also needs to be utilised to clearly communicate the purpose of tasks that students are asked to engage in regularly. This is particularly true for experiences related to

objective B, investigating patterns, as some students were very unclear about the purpose of this form of inquiry, which led to many demotivated responses.

The wide range of student perspectives on comfort and purpose suggest that a one size fits all approach would not be appropriate (Chambers and Coffey, 2018). This highlights a need for differentiation, to support students with learning in a way that is comfortable and purposeful for them, while aligning with necessary learning objectives. A lack of differentiation is thought to explain why students with specific learning needs sometimes struggle upon entry to secondary school (Dixon and Gahir, 2005) and this study showed that all students had their own learning needs. While differentiation is an IB "approach to teaching" tool (IBO, 2014), again it is up to each school to interpret this in a way that is best for its community. A few suggestions would be for teachers to be intentional about relationship building, setting aside a few of the first lessons for this.

Literature makes it clear that strong pedagogical relationships have positive emotional and academic implications, and therefore opportunities to develop this should be supported by schools (Mumford and Birchwood, 2020; Rodrigues et al., 2018). This includes getting to know students personally and academically so that there is a clearer idea of how they prefer to learn and what they would most like to pursue. This is especially true if the method of differentiation harnesses student-led inquiry.

Theoretically, structuring a unit in a way that students could reach the objective through different modes would provide space for autonomy. A suggestion could be to present these through a choice board, as flexibility and choice are praised for supporting meaningful learning experiences (Chambers and Coffey, 2018; Skilling, Bobis, and Martin, 2021). However, this is easier said than done as strong subject, as well as student, knowledge from the teacher is required to differentiate effectively and make meaningful connections (Kaur, McLoughlin, and Grimes, 2022; Mowat, 2019). Furthermore, too much choice can be overwhelming for students at this

stage (Athanasiou and Philippou, 2008) as they adjust to the loss of regulation that primary school often brings (Lucey and Reay, 2000; Visser et al., 2023) suggesting that some students may need support in this.

To support this, as well as to address the themes of change and progress, and specifically student perspectives on them, a focus on developing the ATL (Approaches to Learning) self-management skills (affective, reflective, organisation) early in the transition period is recommended. This means explicitly teaching and equipping students with practical strategies.

Affective skills relate to managing emotions as well as mindset through the learning journey and beyond. The role of mindset was significant in transition success with strong self-regulation positively impacting academic and emotional wellbeing (Anderson et al., 2000; Bharara, 2019, Doerr, 2020, Martin 2020). Explicit teaching of how to handle change, how to view setbacks as part of progress, and how to be resilient are examples of potential focuses; however, they would be very much dependent on the needs of the class.

Reflective skills would benefit students when faced with the freedom of choice presented in the previous recommendation. Here, the ability to reflect on how they best learn and the ideal next step for their progress would support in making the best choice each lesson, with Doerr (2020) suggesting they should be supported in this.

The focus on organisation skills is more in response to literature. Here students expressed a desire for support in becoming more independent (Lucey and Reay, 2000). Students in this study were less vocal about feeling overwhelmed, however this was alluded to with regards to homework and learning “lots of new things”. This suggests that strategies for taking effective notes or utilising a planner could support their organisation (Doerr, 2020). Particularly as students enjoy developing these practical, non-subject specific skills (Visser et al., 2023) and often acknowledge the benefit this can have for their wider wellbeing.

Finally, acknowledging the potential advantage of having an older sibling and the emphasis on peer relationships in literature (Anderson et al., 2000; Bharara, 2019; Doerr, 2020; Rodrigues et al., 2018; Visser et al., 2023), there is a recommendation for a buddy system to be utilised. Furthermore, having a student in an older year as a buddy can offer additional transparency as there is a point of reference for any questions. To best utilise the MYP framework, this could be implemented as a service as action (SAA) program for year 8 students. The intention being that students close in age, and having recently experienced the transition themselves, would strike the right balance between being informative, but not intimidating; a safe space but also a potential friend. This is supported by literature recognising the safety and status found in having a friend in an older year group rather than a parent as a confidant (Bagnall, Skipper and Fox, 2020; Symonds and Hargreaves, 2014). Furthermore, with intentional pairing, a buddy could be used to support higher-achieving students, like Freya, who may desire a community of like-minded mathematicians. With elements of the school environment including community and academic atmosphere, this strategy could support the alignment of students at a stage dissimilar to peers in the same year level.

6.2 Contribution to Knowledge

This thesis makes several original contributions to knowledge.

Firstly, it furthers the body of research into primary-to-secondary mathematics transitions by responding to the identified gap of limited international perspectives (Kaur, McLoughlin, & Grimes, 2022) while also recognising the growth of international schools, in particular those following the International Baccalaureate (IB) programme (IBO, 2024). Situating the study within the context of an international school in Hong Kong resulted in identifying a setting with incoming students from a diverse range of primary schools. This revealed the significance of the primary school experience in shaping students' expectations and encounters during the transition. In particular, the study found

that one pivotal point for how the transition is experienced occurs when a student's expectation aligns or conflicts with their new reality, and that expectation is partly informed by primary school experiences. This highlights the need for differentiated induction experiences that bridge the varied educational backgrounds from which students transition.

Secondly, this study considered alternative perspectives on success in mathematics across the transition. While existing research highlights the potential negative impact of school transitions on mathematical progress (Evans and Field, 2020; Harris and Nowland, 2020) this study aimed to broaden the discussion by focusing on student perspectives and exploring the IB curriculum. Prior studies utilising student voice during this transition period offered insight into the general move between schools, resulting in a more social-emotional focus (Doerr, 2020; Eskelä-Haapanen, Vasalampi and Lerkkanen, 2020; Spernes, 2020) while this study focused students' perspectives on to a single academic subject. In keeping with different perspectives, prior research into different curricula recognised that the priorities of the IB differed from others (Sizmur and Cunningham, 2012) with their aim being to develop students holistically. With a focus on mathematics, the research previously focused on quantitative measures (Orhani, 2022) measuring content-based skills (Ryan, Fitzmaurice, and O'Donoghue, 2021), a narrow aspect of mathematics.

By centering student voice and examining a curriculum that prioritises not just academic skills but also broader learning experiences, the study offers alternative perspectives on what constitutes mathematical progress. These alternative views include students' ability to investigate mathematical concepts independently, draw their own generalisations, effectively communicate their thinking, and apply their knowledge to real-life contexts. Additionally, the study considers the development of skills such as a student's ability to reflect on and self-regulate their learning, as well as collaborate with peers. Through this lens, I hope to encourage researchers to use a wider range of metrics when assessing the transition process in this context, taking into account these broader dimensions of student development.

Furthermore, by integrating Stage-Environment Fit theory and Self-Determination theory, the study highlights how the basic needs of autonomy, competence, and relatedness can be addressed during this life stage, within a school context. While a previous study (Schweder and Raufelder, 2024) had used the two together to analyse to what extent specific practices in secondary schools aligned with the fluctuating needs (SDT) of adolescents (SEF), this study elaborated upon the three basic psychological needs by exploring the nuances in a specific context and re-categorising them into new themes. The development of these needs into actionable themes and recommendations provides practical insights for facilitating change at the classroom level. In particular, it offers teacher guidance for differentiation and intervention, suggesting the benefits of transparency, choice, feedback and flexibility in working with others.

Moreover, this research offers insight into the under-explored curriculum of the IB Middle Years Programme (MYP) mathematics. While relevant findings within other subjects indicated that pedagogical discontinuities could be seen within the IB continuum (Buniel and Ravichandran, 2018; Walker and Lee, 2018), what was less evident in literature was the experience of students who had attended a different primary school, which I was also able to explore. One significant finding in this study is that the assessment criterion B (investigating patterns) is unpopular across a range of students and this study presents several reasons for this. The unfamiliarity in comparison to prior learning experiences, the perceived inability to prepare for it, and the lack of relevance to their lives mean that students' needs for competence, autonomy, and, in this study, their desire for progress, purpose, comfort, and transparency are not met. Understanding this again offers guidance to the relevant educators on how to adapt practice to resolve these obstructions.

6.3 Limitations

The scope of the study restricts to what extent the findings can be transferred or generalised. One significant factor is that this study looked primarily at the students' experiences after transition. Even the capture of voice pre-transition, via the reflection sheet, was only ahead of experiencing a

mathematics lesson. Students had already been in secondary school for a few days and spent time adjusting to the school with their form tutor, so they may have already informed their expectations.

In addition, the study kept navigating students towards their interaction with mathematics. Given the priority of student voice, this restricted what they could share and, in some ways, neglected their multi-dimensional identity. There is no doubt that there were multiple transitions happening in their life beyond mathematics and beyond academics. Therefore, the results from this study only provide a snapshot of the transition process and can not be considered as independent from the rest of their transition experience.

Furthermore, the context of the study brought its own limitations. Despite the case study school being an international school, most students originated from Hong Kong, China, or the UK. This would not be representative of all international schools.

Designing and carrying out the study in the middle of a global pandemic meant that these students did not have a typical transition. Much of their year 6 and year 7 school years were conducted online, which meant that they missed out on many typical transition experiences, such as a taster day. It is difficult to say if this would have affected the theme of transparency or change.

As suggested earlier, the nature of the MYP could be a benefit or limitation. A benefit because most MYP schools should have the flexibility to implement variations of the recommendations to suit the needs of their school. However, because of the openness of the framework, it is difficult to know if a school replicating the study would find similar themes in their student population. This is why a further recommendation would be to utilise narrative inquiry, or at least student voice, to inform any interventions related to transition so that they are relevant to the context.

These factors, with the addition of a small sample size, mean that the findings cannot be generalised. However, I believe that, for the most part, the common themes can be transferred and interpreted case by case.

6.4 Recommendations for research

One aim of this study was to start the discussion about how best to support students in this context. It would be beneficial for some of the recommendations to be developed into action research projects so that their effectiveness can be evaluated. This includes the development of a buddy program through Service as Action, introducing activity choice boards for differentiation, using ATL lessons to explicitly develop self-management skills, or using taster days to introduce students to the key components of the MYP, particularly inquiry-based learning.

It would also be beneficial to conduct additional exploratory studies in other international school contexts. This would add to the small body of knowledge available and better inform the starting points for any action research.

Furthermore, utilising other methodological approaches to hear from additional stakeholders, such as parents and mathematics teachers, could add to the student voice used in this study. Furthermore, a more accurate representation of pre-transition could be captured by beginning the study when students are in year 6 and utilising the perspectives of their teacher at this stage.

6.5 Summary

This study utilised Stage-Environment Fit and Self Determination theory to find that students at this stage are becoming more aware on their needs and priorities, but are also navigating the balance between desiring autonomy and support. Teachers at this stage can play a critical role in providing a safe environment for this navigation to occur, and the tools to address the ever-changing needs.

This study has added to the literature on transitioning into secondary school mathematics by using the context of an international classroom, and the voices of its students. They were able to share how diverse educational backgrounds, cultural expectations, and prior attainment lead to different values, needs and desired support.

Additionally, it has initiated research surrounding the transition into MYP Mathematics and added to the small body of research on the course which otherwise focused on the older year levels. Practically it has provided some considerations for educators in these spaces to implement, in order to support students post-transition. The findings of this study have the potential to benefit students at a critical point of their education, at a critical stage of their life, within a valuable subject.

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Appendices

Appendix A: Email requesting Headteacher's permission

Email to Headteacher

Dear _____

As you are aware, I am currently a PhD student at Lancaster University. I have recently started working towards the research for my thesis which involves hearing from relevant students about the transition from Primary School to MYP Mathematics. I believe that this research will benefit the school as well as the wider IB community as we will start to identify if there are any areas where we could better support students in this transition. I am seeking your permission to ask 16 students in FY1 to participate, with their parents signed consent.

The study would involve me analysing their schoolwork across the year, as well as video narratives which they will complete as a reflection task after their mid-year reports. In addition to this, the students will be invited to participate in a 30-minute to 1 hour focus group, completing three tasks in groups of 3 - 5. Lastly, students would be invited to participate in a follow up interview, lasting no longer than 30 minutes. Attached is the "Participant Information Sheet" and "Consent Form" which I plan to send to the students and their parents with your consent.

Please do ask me any questions you have regarding the study, and I look forward to hearing from you soon.

Appendix B: Participant information sheet (parents)

Participant information sheet – Parent/Guardian

Experiencing the transition into MYP Mathematics

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

As a current PhD student at Lancaster University, I would like to invite your child to take part in a research study about the transition into studying MYP Mathematics.

Please take time to read the following information carefully before you decide whether you permit your child to take part.

What is the study about?

This study aims to hear from students who began studying MYP (Middle Years Programme) mathematics in 2021. It will be exploring pupils' expectations, their reality, and their views across the first year of study.

Why has your child been invited?

I have approached your child because I would like to hear from a range of students who transitioned from different primary school contexts.

I would be very grateful if you would agree for your child to take part in this study.

What will my child be asked to do if they take part?

1) Give consent for some of their responses to learning experiences across the year to be analysed:
    a) Written reflections on perceptions and expectations in mathematics from the start of the academic year.
    b) Samples of work produced for formative and summative assessments.
    c) Grades and feedback received in mathematics during the academic year 2021/2022.
    d) Verbal reflections which were video recorded after pupils received their mid-year report.

    As this is all course work, these work samples will be stored on the school Drive, as per the school policy. Hard copies of a) b) and c) will be kept securely in a locked cabinet in

my classroom. While data from these may be quoted directly in research, any use will be anonymised. Video footage from d) will not be shared externally (beyond myself or the school), instead the audio will be transcribed and it is the written transcriptions which will be used for analysis.

2) Participate in an activity-based focus group which will last between 30 minutes and 1 hour. Your child, along with two other pupils, will take part in three collaborative activities which aim to aid reflection of the mathematics Middle Years Programme. These activities will utilise thinking routines leading to the development of concept maps, the comparison of the primary and secondary setting, and generating a headline which shares what they believe to be most important about the transition. They will be encouraged to ask each other questions that they think are relevant, and I will provide prompts to support the process of sharing their responses in as much depth as possible. This will be audio-recorded, then transcribed. The audio-recording will be kept until transcribed, then permanently deleted.

3) Participate in an interview which should last no longer than 30 minutes. The main aim of this interview will be to allow pupils to clarify any comments made in their reflections and within the focus group activities. They will play a key role in the process to make meaning of their contributions. This will be audio-recorded, then transcribed. The audio-recording will be kept until transcribed, then permanently deleted.

What are the possible benefits from taking part?

Taking part in this study will provide insight into how students experience the MYP and inform the school and the wider IB community about where future students can be supported during this transition.

Does my child have to take part?

While they will still need to complete the classwork, assessments, and homework set, it is not compulsory to have their work analysed within the study. Their participation is voluntary and if they decide not to part in this study, their studies will not be affected in any way.

What if I/my child change our mind?

If either of you change your mind, you are free to withdraw your child during their participation in this study. If you want to withdraw, please let me know, and I will extract any individual ideas or data contributed to the study. However, as focus group data will be analysed collectively, your child's participation in this cannot be isolated if they choose to withdraw after taking part. Once the interview has taken place, you have two weeks to withdraw them from the study.

What are the possible disadvantages and risks of taking part?

The interview process and focus group would take around 1 hour – 90 minutes of their time.

Will my child's data be identifiable?

After the data collection, only I will have access to the ideas your child shares with me.

I will keep all personal information about your child (e.g. their name and other information about them that can identify them) confidential, and I will use pseudonyms when I refer to your child. I will remove any personal information from the written record of their contribution. All reasonable steps will be taken to protect their anonymity.

How will you use the information I have shared with you and what will happen to the results of the research study?

I will use it for research purposes only. This will include my PhD thesis and potentially relevant journal articles. I may also present the results of my study at academic conferences.

When writing up the findings from this study, I would like to reproduce some of the views and ideas your child shared with me. I will only use anonymised quotes (e.g., from the interview and focus group), so that although I will use your child's exact words, all reasonable steps will be taken to protect their anonymity in the publications.

How my data will be stored

The classwork samples, including any written work, videos and assessments will remain on the school Drive, as per the school policy. Parts of the audio transcriptions, from the video reflections, interview and focus group, will be quoted and referenced within my thesis, presentations and articles, however pupils will remain anonymous in each of these cases. I will store hard copies of any data securely in locked cabinets in my classroom and only I will look at it. Audio recordings and data arising from interviews and the focus group will be stored in encrypted files on a password protected computer. Once transcribed, audio recordings will be permanently deleted. I will keep data that can identify your child separately from non-personal information (e.g., their views on a specific topic). In accordance with University guidelines, I will keep the data, including anonymised transcriptions, securely for a minimum of ten years.

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your child's participation in the study, please contact myself at y.chinery@lancaster.ac.uk or my supervisor using the following details:

Carolyn Jackson

xxx

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact the Head of Department:

Paul Ashwin

xxx

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Thank you for considering your child's participation in this project.

Appendix C: Participant information sheet (students)

Participant information sheet - Student

Experiencing the transition into MYP Mathematics

For further information about how Lancaster University processes personal data for research purposes and your data rights please visit our webpage: www.lancaster.ac.uk/research/data-protection

As a current PhD student at Lancaster University, I would like to invite you to take part in a research study about the transition into studying MYP Mathematics.

Please take time to read the following information carefully before you decide whether you wish to take part. You can ask me any questions if you are unsure about any of the following information.

What is the study about?

This study is about the students' experiences when they move from studying primary mathematics to mathematics in the Middle Years Programme.

Why have I been invited?

I have approached you because I would like to hear from a range of students who come from different primary school contexts.

I would be very grateful if you would agree to take part in this study.

What will I be asked to do if I take part?

1) Give consent for some of your work to be analysed:
    a) Written reflections from the start of the year.
    b) Samples of work produced for assessments.
    c) Grades and feedback received in mathematics during the academic year 2021/2022.
    d) Verbal reflections which were video recorded after your mid-year report.

2) Participate in an activity-based focus group which will last between 30 minutes and 1 hour. You and two classmates will take part in three collaborative activities which will help you to reflect on mathematics. You will develop concept maps, compare primary and secondary school, and generate a headline which shares what you believe to be most important about

the transition. You will be encouraged to ask each other questions and I will support the reflection process. This will be audio-recorded.

3) Participate in an interview which should last no longer than 30 minutes. The main aim of this interview will be to allow you to clarify any comments made in their reflections and within the focus group activities. You will play a key role in the process to make meaning of your contributions. This will be audio-recorded.

What are the possible benefits from taking part?

Hearing from you about your experiences will help me, and other teachers, know how to help future students moving from Primary to Secondary school.

Do I have to take part?

No. You will still need to do the normal classwork but it is your decision if you want to have it included in the study. If you decide not to take part, or if you say yes and change your mind later, that is absolutely fine and there will be no negative consequences to you.

What if I change my mind?

If you change your mind, just let me know as soon as possible. I will remove all analysis of your schoolwork and delete all recorded information from the interview. However, as the discussion will happen in a group, it will not be possible to remove your contributions to this. Once the interview has taken place, you have two weeks to withdraw from the study.

What are the possible disadvantages and risks of taking part?

The interview process and focus group would take around 1 hour – 90 minutes of your time.

Will my data be identifiable?

After the data collection, only I will have access to the ideas you share with me.

I will keep all personal information about you (e.g., your name and other information about you that can identify you) confidential, and I will use a different name when I talk or write about you and your data. I will remove any personal information from the written record of your contribution. All reasonable steps will be taken to protect your anonymity.

How will you use the information I have shared with you and what will happen to the results of the research study?

I will use it for research purposes only. This will include my PhD thesis and potentially relevant journal articles. I may also present the results of my study at academic conferences.

When writing up the findings from this study, I would like to reproduce some of the views and ideas you shared with me. I will only use anonymised quotes (e.g., from the interview and discussion group), so that although I will use your exact words, all reasonable steps will be taken to protect your anonymity in the publications.

How my data will be stored

The classwork samples, including any written work, videos and assessments will remain on the school Drive, as per the school policy. Parts of the audio transcriptions, from the video reflections, interview and focus group, will be quoted and referenced within my thesis, presentations and articles, however pupils will remain anonymous in each of these cases. I will store hard copies of any data securely in locked cabinets in my classroom and only I will look at it. Audio recordings and data arising from interviews and the focus group will be stored in encrypted files on a password protected computer. Once transcribed, audio recordings will be permanently deleted. I will keep data that can identify your child separately from non-personal information (e.g., their views on a specific topic). In accordance with University guidelines, I will keep the data, including anonymised transcriptions, securely for a minimum of ten years.

What if I have a question or concern?

If you have any queries or if you are unhappy with anything that happens concerning your participation in the study, please contact myself at y.chinery@lancaster.ac.uk or my supervisor using the following details:

Carolyn Jackson

xxx

If you have any concerns or complaints that you wish to discuss with a person who is not directly involved in the research, you can also contact the Head of Department:

Paul Ashwin

xxx

This study has been reviewed and approved by the Faculty of Arts and Social Sciences and Lancaster Management School's Research Ethics Committee.

Thank you for considering your participation in this project.

Appendix D: Consent form (parent)

CONSENT FORM

Project Title: Exploring the transition into MYP Mathematics

Name of Researcher: Yinka Chinery

Email: xxx

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	☐
2. I understand that my child's participation is voluntary and that they are free to withdraw at any time during their participation in this study and within 2 weeks after they took part in the study, without giving any reason. If they withdraw within 2 weeks of taking part in the study their data will be removed.	☐
3. I understand that any information given by my child may be used in future reports, academic articles, publications or presentations by the researcher, but their personal information will not be included and all reasonable steps will be taken to protect my child's anonymity in this project.	☐
4. I understand that my child's name will not appear in any reports, articles or presentations without my consent.	☐
5. I understand that any interviews and focus groups will be audio-recorded and transcribed and that data will be protected on encrypted devices and kept secure.	☐
6. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	☐
7. I agree for my child to take part in the above study.	☐

Name of Participant	Date	Parent/Guardian's Signature

I confirm that the participant's parent/guardian was given an opportunity to ask questions about the study, and all the questions asked by the participant's parent/guardian have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher xxx **Date** xxx

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University

Appendix E: Consent form (student)

CONSENT FORM – student

Project Title: Exploring the transition into MYP Mathematics

Name of Researcher: Yinka Chinery

Email: xxx

Please tick each box

1. I confirm that I have read and understand the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time during my participation in this study and within 2 weeks after they take part in the study, without giving any reason. If I withdraw within 2 weeks of taking part in the study my data will be removed.	☐
3. I understand that any information given by me may be used in future reports, academic articles, publications or presentations by the researcher, but my personal information will not be included and all reasonable steps will be taken to protect my anonymity in this project.	☐
4. I understand that my name will not appear in any reports, articles or presentation without my consent.	☐
5. I understand that any interviews or focus groups will be audio-recorded and transcribed and that data will be protected on encrypted devices and kept secure.	☐
6. I understand that data will be kept according to University guidelines for a minimum of 10 years after the end of the study.	☐
7. I agree to take part in the above study.	☐

Name of Participant	Date	Participant's Signature

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Signature of Researcher xxx **Date** xxx

One copy of this form will be given to the participant and the original kept in the files of the researcher at Lancaster University

Appendix F: Video narrative prompts

Main question: What has mathematics been like in the first half of MYP1?

Optional things you might want to talk about (you do not need to talk about them all):

- How you feel about the subject (why?)
- How you feel in class (why?)
- What you enjoyed
- What surprised you
- What you found challenging
- What you didn't like
- Have your answers to the above changed since primary school?
- How has the transition been? What has been positive or negative?
- The content/topics covered
- Classroom tasks, activities, resources, style of teaching
- The objectives (A: knowing and understanding, B: Investigating patterns, C: Communicating D: Applying mathematics to real-life problems)
- The Approaches to Learning skills (communication, collaboration, organisation, affective, transfer, critical thinking, creative thinking, information literacy, media literacy, reflective).
- Assessments, feedback, homework, reports, and conferences
- Use of technology (computers, spreadsheets, calculators)
- Classroom environment, atmosphere, and culture