Exploring classrooms that support the growth of top-quartile students

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Abstract

The issue of under-performance or flat-lining of high potential students has received increasing attention. While differentiation is often seen as the key to supporting these students within mixed ability classrooms, there is evidence it is not widely practised by teachers. This research explores the practices and perceptions of teachers whose classes had achieved growth across all student achievement levels, in order to identify factors that may have contributed to the academic growth of top-quartile students. A case study design was used to collect qualitative data from focus group discussions and fieldwork. A grounded theory approach to analysis focused on understanding the perceptions and practices of these teachers. The conceptual categories that emerged describe an approach to teaching that focuses on the holistic development of individual learners and extends the concept of scaffolding to motivation and self-regulated learning as well as cognitive development.
Declaration

This is to certify that:

i. the thesis comprises only my original work towards the masters except where indicated,

ii. due acknowledgement has been made in the text to all other material used,

iii. the thesis is less than 22 000 words in length, exclusive of tables, maps, bibliographies and appendices.

____________________________________

Amy Berry
Acknowledgement

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CHAPTER 1

INTRODUCTION
Chapter 1: Introduction

1.1 Rationale

The issue of underperformance or flat-lining of high potential students has received increasing attention within academic (Griffin, Care, Francis, Hutchinson, & Pavlovic, 2012), professional (Masters, 2015) and popular media (Hare, 2013). Analysis of Australia's performance in PISA shows a decrease in the number of students performing at the top levels of achievement (Thomson, De Bortoli, & Buckley, 2013). If Australia is to remain internationally competitive and economically prosperous, supporting the growth of all students should be a priority (Shomos & Forbes, 2014). Investment in intellectual capital is essential if we are to develop creative, deep-thinking and innovative individuals capable of leading across a range of fields and industries. To do that, it is necessary to understand the impacts of current practices, policies and understandings, and identify the barriers to realising the potential of our top-quartile students. National and international considerations aside, current policy documents clearly assert that all students are entitled to high quality learning opportunities that are engaging and relevant to their individual needs (Ministerial Council for Education Employment Training and Youth Affairs, 2008).

1.2 Developing top-quartile students

While student achievement is complex, it is generally accepted that teachers have an impact on the achievement of their students (Hattie, 2013; Sanders & Horn, 1998). Evidence suggests that teachers skilled in identifying interventions for lower levels of development are less able to do so for higher order skills (Griffin et al., 2012). The focus on delivering the same curriculum to all students and equating learning with high grades means students within the top-quartile of achievement may be successful without having regular access to opportunities to learn (Masters, 2015). Concern over the lack of growth of high-achieving students is not new. In 1997 Wright et al. described the "disturbingly common but not universal pattern for the best students to make the lowest gains" (p. 65); with the authors proposing it may be due to a lack of appropriately challenging experiences. While contemporary Australian policy (ACARA, 2014; Australian Institute for Teaching and School Leadership, 2012) advocates that teachers differentiate the curriculum and instruction to provide learning opportunities for their top students, the practice is not widely implemented in Victorian classrooms (Parliament of Victoria, 2012).
1.3 Differentiation

Differentiation is advocated as the solution to meeting the needs of high-ability students in contemporary Australian classrooms (Munro, 2012; Parliament of Victoria, 2012). There are a variety of models and approaches to differentiation; in general, they aim to modify instruction and curriculum to meet the needs of diverse learners. This student-centred approach sits in contrast to the traditional 'one-size-fits-all' approach. While the work of Tomlinson (2010; 2009; 2014) is prevalent, other models mentioned by Australian state education departments are The Kaplan Model, The Maker Model and The Williams Model (e.g. Support package: Curriculum Differentiation, 2004). Tomlinson and Imbeau (2010) describe differentiation as making adjustments to curriculum, instruction, assessment and the learning environment on the basis of students’ readiness to learn, interest and learning profile. Such a broad conception allows for an array of possible combinations (e.g. adjustment of content based on readiness, adjustment of product based on interest). At present, there is no clear indication whether the different elements (readiness to learn, interest and learning profile) can be differentiated for in isolation or must be addressed simultaneously (Tomlinson et al., 2003). It is possible that such ambiguity and complexity negatively impacts on attempts to put this strategy into practice. Tomlinson (2000) argues that differentiation is a "way of thinking about teaching and learning" rather than a "recipe" to follow (p. 4). This is echoed in the work of Brighton et al. (2005) who found that differentiation was more challenging for teachers who held traditional beliefs about teaching. For them, taking on differentiation required not only learning new strategies but also changing their beliefs about how classrooms should operate (Brighton et al., 2005). Despite these challenges, Wright et al. (1997) found effective teachers were able to facilitate the growth of students at all achievement levels even in heterogeneous classrooms. Given that, there is potential value in beginning the search for solutions by exploring the practices of teachers who have been successful in facilitating the growth of top-quartile student achievement within their mixed ability classrooms.

1.4 The research

The research presented here forms part of a larger project conducted at the Assessment Research Centre at the University of Melbourne. The project is designed to investigate the achievement of top-quartile students. As part of the initial stage of the project, this research explores the perceptions and practices of teachers who successfully facilitated the academic growth of students across all ability levels. It is guided by three questions:
Chapter 1: Introduction

**RQ1** To what do these teachers attribute the growth of their students?

**RQ2** How are the perceived contributing factors (RQ1) evident within their practice and within their classrooms?

**RQ3** Why might the perceived contributing factors (RQ1) and related practices (RQ2) lead to growth for top-quartile students?

While understanding there are inherent differences in the terms 'top quartile' and 'high ability', for the purposes of this research the terms will be used interchangeably. Top quartile denotes a reference to a level of achievement and it is on this basis that study participants were selected (see Chapter 3). However, the research into 'top-quartile students’ is limited and it is not a term commonly used by teachers in schools. For this reason, discussions with teachers and a search of the literature (see Chapter 2) made use of the term high ability to describe students of high academic potential.

In its own right, the research addresses a 'blank spot' (Wagner, 1993) in the research literature pertaining to upper-quartile students and the factors contributing to their achievement in Australian classrooms.
CHAPTER 2

LITERATURE REVIEW
Chapter 2 - Literature Review

2.1 Introduction

An Australian conception of schooling (as presented in The Melbourne Declaration 2008) identifies student growth as an essential aim. This includes not only intellectual growth but also "physical, social, emotional, moral, spiritual and aesthetic development and wellbeing" (MCEETYA, 2008, p. 4). This is no easy task given the heterogeneous nature of contemporary Australian classrooms in which students present with a diverse range of needs and ability levels (Masters, 2013). The current study seeks to explore how teachers facilitate growth in students identified in the upper quartile of achievement within their classroom.

The literature around upper-quartile students is limited, whether in reference to a particular class, cohort or the entire population of these students. There is, however, a substantial body of research into high-ability students. Much of this work comes from the field of gifted and talented education, with the terms ‘gifted’ and ‘high-ability’ often conflated. While it is possible that some upper-quartile students within a classroom may be identified as gifted, this study is interested in students who fall within the upper-quartile of achievement for their classroom, whether or not they have been identified as gifted. The focus of this literature review is on practices that are seen to be effective with high-ability learners within regular classroom settings. A search of both the ERIC and A+ Education (Informit) databases was conducted using the terms: differentiation, differentiated instruction, differentiated curriculum, teaching strategies, high-ability students, gifted, regular classroom, mixed ability classroom, heterogeneous classroom and achievement. Initially the focus was on identifying common themes, debates, landmark studies and key players in the literature. Following citation trails both forward and backward provided further scope to the search. Clear criteria for narrowing the search omitted works that focused on the following: teacher perceptions and beliefs, single-case qualitative studies, identification of gifted students, pull-out and extra-curricular programs, defining giftedness, equity issues and social justice concerns.

2.2 Differentiation

While differentiation is commonly accepted as the answer to meeting the challenge of diverse needs (e.g. Key Characteristics of Effective Literacy Teaching P-6: Differentiating support for all students, 2009) there is evidence of a clear gap between what is desirable and what is practised. This is particularly true in the case of high-ability students. The seminal survey study of Archambault et al. (1993) found only minor adjustments to the curriculum were made for high-ability students within regular classrooms, a finding that was further supported
by the observational study of Westberg (1993). In 2003, a replication of the original survey study (on a smaller scale) found no change to teacher practices despite an increase in professional development over the 10-year period (Westberg & Daoust). A study into the teaching of reading found limited opportunities for appropriately challenging tasks for high-ability readers within elementary classrooms (Reis et al., 2004). As Hertberg-Davis (2009) notes, when teachers do attempt to implement differentiation, they do so for students who are struggling not those who are highly able. In Australia, a recent audit of Queensland government schools revealed a lack of differentiation in practice within classrooms (Mills et al., 2014). Similarly, a 2012 inquiry into the education of gifted and talented students in Victoria found the practice not widely implemented in Victorian primary classrooms (Parliament of Victoria, 2012).

There are numerous barriers to differentiation, beginning with a lack of consensus and clarity about what it entails (Kronborg & Plunkett, 2008; Mills et al., 2014). At times the term differentiation is conflated with ability streaming or tracking (Terwel, 2005) which does not align with more commonly accepted conceptions requiring flexible groupings (see Tomlinson & Imbeau, 2010). In addition, a distinction needs to made between individualised instruction and differentiated instruction (Mills et al., 2014). The constructivist underpinnings of differentiation can present additional challenges to teachers who hold a more traditional view of teaching (Brighton et al., 2005).

Along with the definitional and epistemological challenges discussed above, a range of barriers to implementing differentiation for high-ability learners are cited in the literature. These include: workload pressures, lack of planning time, a lack of pedagogic or classroom management skill (Mills et al., 2014; Nicolae, 2014; Rock, Gregg, Ellis, & Gable, 2008; Tomlinson et al., 2003; VanTassel-Baska & Stambaugh, 2005), concerns around assessment, lack of support or access to resources (Mills et al., 2014; Nicolae, 2014), lack of motivation to differentiate (Nicolae, 2014; Tomlinson et al., 2003; VanTassel-Baska & Stambaugh, 2005) and misconceptions about the practice (Mills et al., 2014; Nicolae, 2014). In 2012, the Victorian Independent Education Union argued the task of differentiating to meet the learning needs of every student within a class "is a mammoth and...impossible task" (Parliament of Victoria, p. 115).

In the case of high-ability students, Kronborg and Plunkett (2008) believe "while many educators manage to differentiate certain aspects of their curriculum, few understand the complexity of the task if it is to be appropriate for advanced learners" (p. 19). VanTassel-Baska and Stambaugh (2005) agree, arguing that it is potentially "more challenging" because teachers may lack sufficient knowledge of the subject matter to allow them to successfully accelerate and scaffold the learning of these students. This is especially true in primary schools where teachers are required to be generalists. The numerous barriers to successful
implementation of differentiation lead Hertberg-Davis (2009) to conclude, "it does not seem that we are yet at a place where differentiation within the regular classroom is a particularly effective method of challenging our most able learners" (p. 252). Despite these barriers, the practice continues to be promoted as the answer to catering for high-ability learners within regular classrooms (Munro, 2012; Parliament of Victoria, 2012).

Empirical support for the differentiation model is limited (Callahan, Moon, Oh, Azano, & Hailey, 2015; Nicolae, 2014). Differentiation asks teachers to respond to student differences in relation to prior knowledge, motivation, engagement and learning profile (Tomlinson et al., 2003). These elements have their basis in existing theory and research (Brighton et al., 2005; Tomlinson et al., 2003). Perhaps the difficulty of measuring the effectiveness of the differentiation model is inherent in the nature of the practice. By definition, it is varied, flexible, dynamic and ongoing; any attempt to isolate the individual elements is at odds with the concept of the practice as a whole. At its core, differentiation involves adjustments to curriculum, instruction, assessment and environment for the purpose of facilitating the learning of individual students (Tomlinson & Imbeau, 2010). While acknowledging that proponents of the model do not advocate treating differentiation as a collection of unrelated strategies (Tomlinson, 2000), for the purposes of this discussion attention will focus on specific adjustments that have been associated with academic achievement of high-ability students within heterogeneous classrooms.

2.3 Differentiation based on readiness for high ability students

Differentiation by readiness to learn is based on Vygotsky’s (1978) concept of the zone of proximal development (ZPD). Learning is described in terms of a developmental progression, with the ZPD representing the area within the progression where a student can achieve success with the assistance of a more able other. Above this zone the student is unlikely to succeed (at this point in time) even with guidance. Below the ZPD is the student's zone of actual development, the area where a student can reliably produce a desired behaviour or level of understanding without assistance. The ZPD represents the area where the student is most ready to learn. Recent work in the area of developmental teaching (see Hutchinson, Francis, & Griffin, 2014) and learning trajectory based instruction (see Sztajn, Confrey, Wilson, & Edgington, 2012) are approaches that aim to differentiate based on readiness. Hutchinson, Francis and Griffin (2014) describe a process of identifying a student's place along a developmental progression that represents learning in relation to a construct (e.g. literacy, collaboration, problem solving, etc.). Similarly, Wilson et al. (2015) describe the use of learning trajectories as frameworks for cognitive development in relation to a topic. Inherent in these developmental approaches is the belief that all students can experience
growth, or movement along the progression. It is argued that assessment can be used to identify the place along a progression where the student is most ready to learn (their ZPD). This information is used to target the learning needs of students and scaffold their development. Scaffolding refers to support given to students working within their ZPD, with the understanding that it will be gradually removed as the student grows in ability and confidence (Wilson & Devereux, 2014; Wood, Bruner, & Ross, 1976). Such an approach places students (rather than curriculum) at the centre of instructional decisions. This is in contrast to a model of teaching that focuses on delivering a curriculum and meeting identified standards. Importantly, the developmental model asks teachers to plan for the growth of top-quartile students and provides the tools to do so. From a standards focused approach, planning for students who have achieved the standard is not an inherent requirement and for those teachers who attempt to, there is no clear path for extending their learning or for determining what they are capable of beyond the defined standard.

For high ability students who have mastered some or all of the content and skills of a proposed unit, adjustments should be made to ensure they are adequately challenged (Rogers, 2007). Adapting both curriculum and instruction is essential to the growth of these students (Dolph, 2009; Kronborg & Plunkett, 2013; VanTassel-Baska & Stambaugh, 2005). This includes increasing the level of complexity and adapting the pace for students who learn more quickly (Munro, 2012; Rogers, 2007).

### 2.3.1 Curriculum Compacting

Curriculum compacting is a well-supported strategy for adapting the curriculum and creating opportunities for growth (Dolph, 2009; Drain, 2009; Kronborg & Plunkett, 2013; Rogers, 2007). Aligning with remedial approaches of assessment, diagnosis and intervention, it can be defined as “the process of identifying learning objectives, pretesting students for prior mastery of these objectives, and eliminating needless teaching or practice if mastery can be documented” (Reis, Burns, & Renzulli, 1992, p. 10). Results of pre-testing allow teachers to use the time 'bought' to provide acceleration or enrichment opportunities for students (or to move through material at a faster pace if not all objectives have been met).

A related strategy is Julian Stanley's (1991) Diagnostic Teaching-Prescribed Instruction (DT-PI) or Diagnostic-Prescriptive Assessment model. It also uses pre-assessment to identify and eliminate mastered content but goes further to advocate for accelerated instruction and content through the use of ability grouping (VanTassel-Baska & Stambaugh, 2005). This model is not as well cited as curriculum compacting, perhaps due to the fact that Stanley is associated with identifying and developing highly gifted students through pull out programs such as Talent Search (Stanley, 1991) while Renzulli's work takes a more inclusive view that
is conducive to regular classroom application and school wide implementation (see Renzulli, 2008).

A study into the effects of compacting on test scores showed a positive effect on motivation and engagement of students and no significant differences in the results of students who had the content compacted and those that did not (Reis, Westberg, Kulikowich, & Purcell, 1998). While the authors were hopeful this would allay fears about missed content, it appears that compacting on its own is unlikely to account for achievement gains. The lack of gains in this study is unsurprising given that replacement tasks for students were not confined to the subject area that was compacted. Decisions on how to use the time 'bought' from eliminating mastered content are key to the process. Reis and Renzulli (2007) advise 'the ultimate criteria for replacement activities should be the degree to which they increase academic challenge and the extent to which they meet individual needs' ("Providing acceleration and enrichment options" para. 2). Rogers (2007) points to the significant and positive effects of compacting on student achievement in the areas of maths and science when replacement tasks involve accelerated content and complexity. The gains for reading and social studies are less, possibly due to "the deepening and broadening more likely to occur in those areas rather than picking up the pace or advancing the grade level of materials provided" (Rogers, 2007, p. 386). What appears on the surface to be a straightforward practice of pre-testing and replacing content already learned becomes potentially complex when faced with decisions on what to replace it with. Any attempt to measure the effectiveness of compacting must first understand the context in which the planning of replacement activities was made. This includes the intentions of the teacher, evidence used to identify students, as well as the nature of the replacement tasks themselves.

The use of compacting allows teachers to provide opportunities for acceleration and enrichment. These two practices may be used in conjunction (Assouline, Blando, Croft, Baldus, & Colangelo, 2009) and are seen by some as complementary (Schiever & Maker, 1997). Tannenbaum (2009) argues that acceleration is one form of enrichment, therefore it is illogical to conceive them as opposing alternatives. His argument highlights the existence of an ongoing debate, what VanTassel-Baska (2007) refers to as the "persistent programmatic division in the field between accelerative and enrichment approaches" (p. 344).

2.3.2 Acceleration

The commonly accepted definition of acceleration comes from Pressley, describing it as "an educational intervention based on progress through an educational program at rates faster or at ages younger than typical" (in Colangelo, Assouline, & Gross, 2004, p. 1). Colangelo et al. (2004) clarify the practice further noting that it involves "matching the level, complexity and pace of the curriculum with the readiness and motivation of the student" (p. 1). This indicates
a broader conception of student development that goes beyond academic considerations and acknowledges the potential impact of student motivation, this will be discussed later in this chapter.

In Australia, acceleration can take many forms. System level options include early entry to school or university, grade skipping and extracurricular activities. Classroom level options include individually paced learning, telescoping to cover content in a shorter time and content/subject acceleration either within class or with another class. Despite that diversity, according to Kronborg and Plunkett (2012), "teachers in Australia tend to think of accelerated learning in terms of compacting curriculum and providing advanced content in specific subjects" (p. 39). This form of acceleration is most relevant to the current study as it relates to within-class practices, available to regular classroom teachers and potentially applicable to a wider group of high-ability students as it does not require system level identification and provision of service. Indeed, Maher and Geeves (2014) argue that acceleration can be beneficial to many high-ability students, not just those identified as gifted.

While there is considerable support within the literature for the use of acceleration with high-ability students (Colangelo et al., 2004; Drain, 2009; Kronborg & Plunkett, 2008; Missett, Brunner, Callahan, Moon, & Azano, 2014; Steenbergen-Hu & Moon, 2011; VanTassel-Baska & Brown, 2007), in practice it is underutilised (Kronborg & Plunkett, 2008; Maher & Geeves, 2014; Missett et al., 2014). This may be due to teachers underestimating the ability of their students (Missett et al., 2014) or to the myths and misconceptions that surround this practice. Key misconceptions are concerns that acceleration will lead to gaps in learning, a belief that acceleration is only for a small minority, concerns that acceleration will lead to negative social-emotional consequences and concerns over the equity of the practice (Assouline et al., 2009; Maher & Geeves, 2014).

Within the field of gifted education, debates continue around when and how to accelerate. Some argue that acceleration is appropriate for sequential content in areas such as mathematics and foreign languages, while enrichment for breadth and depth is preferred for subjects such as history and literature. In contrast, others believe that acceleration for all content areas is appropriate (Missett et al., 2014). Renzulli (1999) maintains that acceleration is beneficial to developing what he terms 'schoolhouse giftedness', which is easily measured on standardised achievement tests and highly valued within current educational systems, but not necessarily ideal for developing a student's potential as a creative producer.

VanTassel-Baska (2005) refers to acceleration as a 'nonnegotiable' but acknowledges that content-based acceleration (the form most likely to be used by classroom teachers) is often limited to certain subjects, most notably mathematics, and to a certain rate. Concerns students will race too far ahead of their peers often limits the opportunities for acceleration provided to high-ability students within regular classrooms (VanTassel-Baska, 2005).
While research into acceleration suggests a strong positive link to achievement, the diversity available under the umbrella of ‘acceleration’ needs to be considered. To compare the achievement effects of grade skipping with that of within-class mathematics acceleration appears problematic. In terms of the student's opportunity to learn, it would seem an inappropriate comparison. Given that, any attempt to generalise the level of effectiveness of this practice must be treated with caution.

2.3.3 Enrichment

Enrichment refers to the exploration of content in greater depth and breadth than the regular curriculum allows, including connections with other areas of study beyond the current classroom focus. Arguably the most well known proponent of enrichment is Joseph Renzulli. His Enrichment Triad Model and Schoolwide Enrichment Model (SEM) have been implemented internationally and researched for over 20 years. Renzulli's (2008) view of enrichment involves the purposeful design of 'high-end learning' experiences that allow for application of knowledge and skills to real-life problems (p. 5). Experiences must be relevant, open-ended and involve the creation of products or new knowledge aimed at a real audience (Renzulli, 2008). The SEM is a whole school approach aimed at improving the academic performance of all by shifting the focus from achievement to the development of potential. It incorporates the Enrichment Triad Model and is based on Renzulli's Three-Ringed Conception of Giftedness. The Enrichment Triad Model was designed to develop students’ skills as creative producers and describes three levels of activities. Type I activities are available to everyone and involve exposure to a variety of experiences, topics, people, occupations and ideas. Type II activities involve the development of skills that will be needed for Type III independent study. Type II activities can be implemented in the regular classroom (whole class or with small groups). Type III activities involve self-selected engagement with real-life problems and are generally reserved for higher ability students. Curriculum compacting is used and allows for both acceleration and enrichment as options for students.

Several recent experimental studies using the Schoolwide Enrichment Model-Reading (SEM-R) found increases in fluency but no significant gains in reading comprehension (Little, McCoach, & Reis, 2014; Reis, Eckert, McCoach, Jacobs, & Coyne, 2008; Reis et al., 2007). It is suggested the lack of gains in comprehension might be due to the test used or to the short time frame for intervention. Later research using an extended intervention period of 8 months found significantly higher post-test scores for the intervention group (Shaunessy-Dedrick, Evans, Ferron, & Lindo, 2015). It is important to note that none of these studies focused on high-ability students. Reis and Boeve (2009) conducted a mixed methods study of an after school enriched reading program for gifted students and found students were initially
frustrated by the level of challenge and showed a preference for less challenging texts, however, with encouragement they made progress. This highlights the influence of students' willingness to engage with challenge as well as the importance of providing adequate support. At issue in the measurement of the effects of acceleration and enrichment is the instrument used to test growth as well as the nature of the adjustment. While programs based on enrichment are more commonly used in classrooms, research provides more support for accelerative approaches (Reis & Renzulli, 2003). Acceleration typically involves objective variables such as scores or performance-based measures. In contrast, the variables associated with enrichment are more complex and its outcomes harder to measure (Reis & Renzulli, 2003).

The imperative to modify the curriculum and instruction for high-ability students requires a willingness to employ some form of ability grouping or independent learning (Rogers, 2007; VanTassel-Baska & Brown, 2007) as well as quality assessment practices (VanTassel-Baska & Brown, 2007).

2.3.4 Ability grouping

The research around ability grouping is vast but complicated by a lack of distinction between in-class, flexible ability grouping and school based streaming or tracking. The research indicates that grouping on its own has no effect on achievement. If, however, ability grouping is accompanied by appropriate adjustments to curriculum and instruction, there is a positive effect on the achievement of high-ability students (Kulik, 1992; Lou et al., 1996; Missett et al., 2014; Rogers, 1991, 2007; Tieso, 2003). As Rogers (1991) notes, "it is unlikely that grouping itself causes academic gains; rather, what goes on in the group does" (p. xi). In terms of differential effects based on subject area, it has been argued there are larger effects on academic achievement for subjects such as math and science where tasks are hierarchical compared to reading (Lou et al., 1996).

In addition to academic gains, ability grouping has been linked with gains in motivation, engagement, creativity and critical thinking (Rogers, 1991, 2007). The benefit for high-ability students is dependent on the adjustments to curriculum and instruction that are made based on the readiness levels of the students within the group. As such, the necessity for effective assessment and monitoring procedures as well as the ability to match tasks to student needs is essential.

2.3.5 Independent learning

In the absence of grouping based on achievement or ability, Rogers (2007) argues for the use of independent learning opportunities that are supervised, structured and provide the
appropriate levels of challenge and support. The success of independent study depends on the student's preference for individual or group learning as well as their level of skill and motivation for completing independent learning tasks. Research shows limited academic gains for independent study in the primary years although there are benefits to students' critical thinking, creative thinking, self-reliance and ability to explore topics and concepts (Rogers, 2007). These findings support programs such as the Schoolwide Enrichment Model and self-regulated learning interventions that provide training in the skills necessary for self-selected independent study.

2.4 Assessment

Central to the provision of appropriate and sufficient challenge for high-ability students is the need to modify curriculum and instruction to meet their needs. Identifying these needs requires ongoing and reliable means of assessing individual learners. It is argued that linking meaningful assessment with instruction is essential for effective differentiation (Tomlinson et al., 2003). A developmental approach to assessment that focuses on the potential for growth (as movement along a continuum) is recommended (De Corte, 2013; Ford, 2012). From this approach, assessment is ongoing and serves as a tool to monitor students and make adjustments in order to improve learning (De Corte, 2013; Ford, 2012). Opportunities for assessment throughout the planned unit allow modifications to be made based on emerging needs and demonstrated mastery. The use of a variety of methods provides further opportunity for students to demonstrate their understanding and skill (Ford, 2012; VanTassel-Baska, 2014). VanTassel-Baska (2014) recommends the use of standardised testing to assess content mastery and performance-based assessment to assess higher order thinking and problem solving ability. In defence of performance-based assessment, she points to the need to match assessment with the call for open-ended tasks, high-level learning and a focus on metacognition (VanTassel-Baska, 2014).

2.5 Differentiation for engagement

A key characteristic of differentiation is responding to student difference. Tomlinson et al. (2003) describe this difference not only in terms of prior knowledge, but also interest, level of engagement and approach to learning. The concept of readiness discussed above addresses differences in academic or cognitive development. Students also differ in their motivation to learn and engage in tasks. It has been found that “students’ motivation and engagement can have a profound impact on their classroom performance “ (Thomson et al., 2013). Accordingly, the differentiation model aims to address both the academic and affective needs
of students. Tomlinson and Imbeau (2010) describe the response to affective needs as guiding students towards a positive attitude to learning and themselves as learners. According to Tomlinson and Jarvis (2009), differentiation by student interest and learning style has been linked to positive affective outcomes such as increased motivation and engagement as well as achievement gains.

Engagement is an important predictor for achievement and can be described as having three dimensions: behavioural, affective and cognitive (McCormick & Plucker, 2013). Others have proposed a fourth dimension - academic engagement (Appleton, Christenson, & Furlong, 2008). Collectively, these components describe the level of participation and interest in school activities as well as less visible indicators such as attitude to learning, self-regulation and ownership of learning. The relationship between engagement and motivation is often debated. Appleton et al. (2008) propose that motivation can be understood as the direction, quality and intensity of a person's energy, while engagement is the person's active involvement in an activity. Important for the engagement of high-ability students is the opportunity to be appropriately challenged and take an active role in the learning process as well as the need to feel cared for by the teacher (McCormick & Plucker, 2013) and engage socially with their peers (Reis & Renzulli, 2004). Such recommendations allude to the importance of ensuring high-ability students are not only active in their own learning but emotionally and cognitively engaged as well. Tomlinson (2014) advises the learning environment is a key element to student success in a differentiated classroom.

2.5.1 Classroom environment

Within the literature, classroom environment is defined in a variety of ways and referred to as classroom social environment, classroom social climate, learning environment, classroom psychological environment and classroom climate (Patrick, Kaplan, & Ryan, 2011). Current conceptions include the following elements: rules, norms, policies, procedures, safety, support, relationships, interactions, discipline and autonomy (Frazier et al., 2015). Patrick et al. (2011) describe the research in this area as data driven and rich with evidence from classrooms but lacking in cohesion or theoretical basis. Positive classroom climates have been described as having clear rules and expectations for behaviour, high expectations for learning and high levels of pro-social behaviour (e.g. caring, respect, collaboration, cooperation).

Matsumura et al. (2008) describe the relationship between the quality of the classroom climate and the rigour of the learning activities as elements that "reinforce each other and contribute to students' learning experiences" (p. 309). In their study, encouraging pro-social behaviour was linked to increased student participation in discussions, while teacher expectations of students influenced the level of academic demand they placed on students (Matsumura et al., 2008). Others have shown that students' perception of teacher support is
linked to increased effort, pro-social behaviour (Turner, Gray, Anderman, Dawson, & Anderman, 2013; Urdan & Schoenfelder, 2006), greater self-efficacy, use of self-regulated learning strategies (Turner et al., 2013) and engagement (Patrick, Ryan, & Kaplan, 2007; Patrick, Turner, Meyer, & Midgley, 2003; Turner et al., 2013; Urdan & Schoenfelder, 2006). While the research into classroom climate may not provide evidence of a direct relationship to student achievement, it does identify practices related to student motivation and engagement (Patrick et al., 2011) which have been empirically linked to student outcomes (e.g. Hornstra, van der Veen, Peetsma, & Volman, 2013). Research into classroom climate and high-ability students focuses on the aspects of the environment that relate to motivation and self-regulation (e.g. Rubenstein, Siegle, Reis, McCoach, & Burton, 2012). The link between motivation and achievement has been highlighted in studies of gifted underachievers (McCoach & Siegle, 2003; Rubenstein et al., 2012). Gifted underachievers have been described as students who are expected to achieve at a high level (based on measures of ability) but exhibit a much lower level of actual achievement (McCoach & Siegle, 2003). Contrary to previous research, McCoach and Siegle (2003) found no difference in the academic self-perception of gifted underachievers and high achievers but significant differences in the value that they placed on academic goals and their level of motivation to engage with academic tasks. Rubenstein et al. (2012) agreed, noting that in their experience, gifted underachievers often had the skills to achieve but lacked the motivation to do so. Their study of underachievement interventions for gifted students identifies student perception of the environment as one the most influential factors influencing achievement (the other being task meaningfulness) (Rubenstein et al., 2012).

2.5.2 Motivation

A growing body of research has explored the motivational climate of classrooms (e.g. Patrick et al., 2011) with the dominant view of academic motivation conceiving it as a product of individuals interacting within the learning environment (Urdan & Shoenfelder, 2006). While a detailed discussion of the various theories of and research into motivation are not possible in this context, two theories will be discussed for their relevance to this research: self-determination theory and achievement goal theory.

Self-determination theory and need supportive teaching

Self-determination theory (SDT) is a theory of motivation based on the assumption that all people have "inherent growth tendencies and basic psychological needs that provide a motivational foundation for their optimal functioning, academic engagement, constructive social development, and personal well-being" (Reeve, 2006, p. 226). From this assumption, three basic needs have been identified as important to motivation: the need for autonomy,
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Competence and relatedness (Reeve, 2006). Autonomy is seen as critical to motivation and refers to feelings of control over one's behaviour and success. Competence is related to feelings of self-worth, while relatedness refers to a sense of belonging and is associated with one's willingness to follow the rules and norms of a social context (Urdan & Shoenfelder, 2006). Classrooms differ in how well they facilitate (or thwart) these three basic needs (Urdan & Shoenfelder, 2006; Reeve, 2006). Theoretically, teaching that meets these needs would lead to high levels of intrinsic motivation, although there has been limited classroom based research into how this is done (Stefanou, Perencevich, DiCintio, & Turner, 2004; Stroet, Opdenakker, & Minnaert, 2014; Urdan & Schoenfelder, 2006). Findings suggest students in autonomy supportive classrooms have higher levels of perceived competence and intrinsic motivation than those in more controlling classrooms (Furtak & Kunter, 2012; Urdan & Schoenfelder, 2006). Autonomy support has been positively related to achievement, on-task behaviour and a positive attitude to learning (Stefanou et al., 2004). In relation to gifted primary students, feelings of autonomy in relation to their learning has been positively linked to engagement (McCormick & Plucker, 2013).

Achievement goal theory and mastery goal structure

Achievement goal theory provides an alternative theory of motivation based on the premise that individuals can be characterised as holding either an entity belief (fixed mindset) or an incremental belief (growth mindset) about intelligence with each belief associated with certain motivational patterns. Those with an entity view see intelligence as fixed and unrelated to effort, while those who hold an incremental view believe intelligence to be malleable and related to effort and learning. Research has shown even when students have an equal level of ability, their beliefs about intelligence shape the way they respond to challenge (Blackwell, Trzesniewski, & Dweck, 2007). In general, an entity view is associated with performance goals, while an incremental view is linked with mastery or learning goals. Personal goals are those pursued by an individual, while goal structure refers to the goals perceived by the individual from messages transmitted in the learning environment. It has been shown that students perceive the goal structure of a classroom by looking at how the teacher interacts with students (Patrick et al., 2011); in fact, the relationship between perceived teacher support and perceived classroom goal structure are so closely related as to be inseparable at the start of the school year (Turner et al., 2013). There is evidence to support a correlation between classroom goal structure and students' personal goals (Urdan & Shoenfelder, 2006). While it is possible for teachers to emphasise both performance and mastery goals within the same classroom (Ciani, Middleton, Summers, & Sheldon, 2010; Patrick et al., 2011) and students to perceive the goal structure in different ways (Patrick et
al., 2011), the positive benefits of promoting mastery goals are widely accepted. Mastery goals have been linked to deep learning (Anderman & Patrick, 2012; Grant & Dweck, 2003), higher use of self-regulated learning strategies, higher levels of intrinsic motivation, greater persistence (Grant & Dweck, 2003), greater willingness to engage with challenging tasks and more positive attitudes towards school and work (Urdan & Shoenfelder, 2006). The relationship between goal structure and student achievement is less clear. Anderman and Patrick (2012) argue that it depends largely on how achievement is measured noting if only surface learning is measured it is unlikely a mastery goal focus will be linked to achievement as it is associated with deep learning. The positive relationship between performance-approach (versus performance-avoid) goals, associated with surface learning, and high grades is more consistent (Anderman & Patrick, 2012).

Although little is known about the mindsets of gifted students, there is often a misconception they have growth mindsets (Esparza, Shumow, & Schmidt, 2014). Even if true, they are at risk of developing fixed mindsets when contextual factors emphasise ability (C. S. Dweck, 2008); fixed mindsets can lead to decreased motivation to learn (Haimovitz, Wormington, & Corpus, 2011), increased perfectionism and underachievement (Esparza et al., 2014). Little is known about how children develop goal orientations (Wigfield & Cambria, 2010) or how goal structures are communicated within classrooms (Patrick et al., 2011; Turner et al., 2002; Urdan & Schoenfelder, 2006). Differentiation has been described as “a growth mind-set endeavor” (Tomlinson & Imbeau, 2010, p. 33).

In a review of theory and research into motivation and gifted students, Clinkenbeard (2012) offers the following recommendations for teachers of high-ability students: attempt to match the level of challenge to their level of ability, help students to see the value of the task, allow some element of student choice, provide opportunities for students to work with their peers (based on interest and ability), teach students to understand effort and challenge are a part of learning, provide useful feedback that can help them to improve and praise effort and independence rather than ability, speed or correctness.

### 2.6 Self-regulation of learning

While differentiation based on students’ learning profile is designed to support student engagement and academic growth, it also aims to develop students’ independence and awareness of themselves as learners (Tomlinson, 2014). The concepts of motivation and metacognitive awareness are linked to self-regulated learning theory. Although there are a variety of definitions of self-regulated learning, current conceptions generally describe three components: cognition, metacognition and motivation/affect (Dignath, Buettner, & Langfeldt,
Pintrich (2004) includes behaviour and context as additional areas for regulation. In addition, the process can be discussed in terms of the phases of self-regulation: planning, monitoring, reflection on performance (Pintrich, 2004; Wigfield, Klauda, & Cambria, 2011), with Pintrich (2004) adding a 'control' phase. While the research into self-regulated learning has been accused of having an abundance of competing definitions and models (Dignath et al., 2008; Schunk, 2008), they are broadly similar while differing in emphasis on the various elements of the process (Boekaerts & Corno, 2005; Dignath et al., 2008). The definition offered by Zimmerman and Schunk (2011) describes students' self-regulation as "the degree they are metacognitively, motivationally, and behaviorally active participants in their own learning processes" (p. 49). This definition suggests a clear link with engagement.

Some believe developing the self-regulatory skills of high-ability students is an essential component in their development as learners (Callahan et al., 2015; Little, 2012). Research shows that training and intervention programs have been effective in developing students' skills in this area and linked to increased academic performance, strategy use and motivation (Dignath et al., 2008). Although Patrick et al. (2007) caution the link to academic performance is dependant on the instrument used to measure that performance. Some advocate developing these skills in high-ability students as a strategy to improve achievement, others argue it is more effective to focus on motivational interventions (Rubenstein et al., 2012). Rubenstein et al. (2012) go as far to suggest that self-regulation of learning may actually be a "byproduct" of motivation (p. 684). It has been found the use self-regulating strategies varies widely amongst gifted students and is influenced by the learning environment (Housand & Reis, 2008).

2.7 Summary

Realising the potential of our high-ability learners requires providing authentic, appropriate learning opportunities for them that will engage them, challenge them and develop the skills they need to continue to grow. Establishing a classroom culture that rewards and values growth and risk taking, focuses on deep thinking, engages students in high-level learning and provides a safe and supportive community of learners is vital for the success of all students. The research suggests it is not about finding one strategy or practice that works for all, but providing a variety of tasks, resources, instructional methods and assessment opportunities in order to meet the needs of a diverse set of learners. Beyond adjusting the curriculum and instruction to meet the needs of high-ability learners, efforts should be made to establish an environment that supports their motivation and ability to engage and persist with tasks.
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3.1 Rationale

The assumption that teachers have an effect on the academic achievements of their students is supported by the research literature. Wright et al. (1997) found “teacher effects are dominant factors affecting student academic gain” (p. 57) and Nye et al. (2004) described them as “large enough to be important” (p. 255). Hattie (2003) went farther to say teacher effects account for roughly 30% of variance in student achievement, the largest effect after student factors. In his meta-analysis on achievement, he went on to identify the effect size of specific teaching practices (Hattie, 2013). The use of effect size studies in education is not without its critics. Wiliam (2010) warns they can be difficult to interpret due to the influence of variance within the population of each study as well as the comparability of outcome measures and their relationship to classroom instruction. The current study assumes teachers have an effect on student achievement while acknowledging the effect size of individual teachers and specific practices may be debated. The purpose here is to explore the practices of teachers who have been identified as facilitating growth across all student achievement levels with the aim of identifying factors that may have contributed to the academic growth of their top-quartile students. The study will be guided by three questions:

RQ1  To what do these teachers attribute the growth of their students?

RQ2  How are the perceived contributing factors (RQ1) evident within their practice and within their classrooms?

RQ3  Why might the perceived contributing factors (RQ1) and related practices (RQ2) lead to growth for top-quartile students?

3.2 Research design

Current frameworks that attempt to describe effective teaching such as The Dynamic Model (Kyriakides, Creemers, & Antoniou, 2009) and Danielson's (2011) Framework for Teaching do not go as far as to identify what teacher practices might be effective for high achieving students. Turning to the literature on teaching high-ability students, there appears to be consensus on the need to adjust the pacing and complexity of tasks and instruction but less agreement on what that should look like within the classroom. Given that current models do not adequately fit with the aims of this research, an exploratory approach was favoured in order to understand what practices might be linked to gains in top-quartile students within current Victorian classrooms. The exploratory nature of the research lends itself to a
qualitative design (Merriam, 2009). Rather than attempt to quantify and measure the practices of teachers, a qualitative approach seeks to understand the complexity of their practice within the naturalistic context of the classroom.

This study is positioned within a larger project with the aim of developing a conceptual framework to guide later stages of research. Given the aims of exploring the classroom practices of current teachers in order to build a substantive theory of what practices might be effective with top-quartile students, a case study design informed by grounded theory was selected. These two approaches to research are traditionally presented as separate and distinct paths (for example Creswell, 2003). More recently, Andrade (2009) has argued the advantages of combining the two approaches. While a case study design is useful in defining the boundaries of what will be studied, it can be seen as lacking in guidelines when aiming to build theory from an interpretivist perspective; the inductive and process driven grounded theory approach provides a useful complement by addressing these shortcomings of case study design (Andrade, 2009). In *Case Study Research in Education: A Qualitative Approach* (1988), Merriam also discusses the use of a grounded theory approach to analysis in studies that aim for generating hypothesis and theory building as opposed to purely descriptive studies. Regardless of whether or not theory development is the aim, Charmaz (2014) points to the usefulness of the grounded theory approach as a ‘path’ through the research process (p.16).

### 3.2.1 Case study

According to Merriam (1988), the decision to choose a case study design for research requires the consideration of four factors: the research question, the amount of control, the end product and the existence of a *bounded system* (pp. 9-10). Research that aims to produce "a holistic, intensive description and interpretation of a contemporary phenomenon", rather than an experimental investigation into cause-and-effect relationships, is suited to descriptive research methods such as case studies and surveys (Merriam, 1988, p. 9). While the first research question (*To what do these teachers attribute the growth of their students?*) could have been answered through the use of a survey or interview, the other questions sought a deeper understanding of the context of teacher practices (*How are the perceived contributing factors evident within their practice and within their classrooms?*) and an interpretation of the possible links between teacher practice and student outcomes (*Why might the perceived contributing factors and related practices lead to growth for top-quartile students?*). The nature of these questions was therefore more appropriate for case study as it involves 'how' and 'why' rather than 'what' or 'how many' (Merriam, 1988).

The final factor in determining whether or not case study is appropriate relates to the identification of a *bounded system* (Merriam, 1988; Yin, 2009). This involves defining what
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will and will not fall within the boundaries of 'the case'. Unlike narrative research, which focuses on the individual, case study research is predominantly concerned with an issue, with cases selected for their potential to aid in understanding the issue (Merriam, 1988). Again, the research questions provided an avenue for identifying and defining the case to be studied. This study looked to explore the issue of top-quartile student growth within the context of the current educational system. As such, the bounded system was defined as classrooms in which top-quartile students had demonstrated academic growth. From a social constructivist paradigm, learning occurs within the social context of the classroom and may be mediated through teacher practices as well as interactions between students and teachers (Gillies, 2014). Classrooms selected in this study were explored with the aim of describing teaching practices that may be linked with the phenomenon of top-quartile student growth and the social context within which these practices are evident. Moving beyond these descriptive aims, the study sought to develop a preliminary conceptual framework and hypotheses to be investigated in future research. The heuristic nature of case studies is particularly useful in discovering new meanings and new relationships as well as confirming or deepening current understandings (Merriam, 1988).

3.2.2 Grounded theory

The focus of grounded theory is on analysis rather than data collection. The choice of grounded theory aligns well with theory building rather than testing and refers to an inductive approach to developing theory that is grounded in the data collected (Charmaz, 2014; Strauss & Corbin, 1998). A grounded theory approach is appropriate for problems that cannot be adequately explained by existing theories (Creswell, Hanson, Plano, & Morales, 2007). Strauss and Corbin (1998) describe a process that begins with description of a process or phenomenon and moves to interpretation in order to develop conceptual categories. The final step involves making connections between these conceptual categories to construct a theory that may be used to explain and predict. Objectivist grounded theory, as seen in the work of Strauss and Corbin (1998), maintains the existence of an external and discoverable reality that is independent of both researcher and participant. In this form, the objectivity of the researcher is crucial to the aims of providing "an impartial and accurate interpretation of events" (Strauss & Corbin, 1998, p. 42). In contrast, Charmaz (2000) proposes a constructivist form of grounded theory in which data is not seen as a "window on reality", rather, its meaning is constructed by both researcher and participant within a particular context (pp. 523-524). The contrasting epistemologies that underpin the different approaches are most apparent in their differing aims and the "foundational assumptions" on which studies are based (Charmaz, 2014, p. 14). Objectivist grounded theorists seek to develop theory that is verifiable, testable and can be used to explain and predict. The constructivist approach also
seeks to develop theory, but for the purposes of explaining and understanding a particular reality rather than a generalizable truth. As this research sought to understand teacher perceptions, as well as the social context in which they practised, a constructivist approach was a more appropriate fit. Despite the differences in these forms of grounded theory, they share key elements which Charmaz (2014) sees as the basis of all grounded theory studies: simultaneous data collection and analysis, analysis that focuses on actions and processes, using comparative methods for data analysis, drawing on data to develop conceptual categories and the development of "inductive abstract analytical categories" through analysis (p. 15).

While this study offers an initial conceptual framework to take into future investigations, theoretical sampling was beyond the scope of this work. Theoretical sampling is seen as a key element of the grounded theory approach by some (Hood, 2007). It refers to the practice of returning to the field to collect specific information that will aid in the development of emerging categories (Charmaz, 2000; Strauss & Corbin, 1998). As Charmaz (2014) notes, "In practice, however, few researchers show evidence of conducting theoretical sampling and of constructing theory" (p. 15).

3.3 Ethical Considerations

The Humanities and Applied Sciences Human Ethics Sub-Committee at the University of Melbourne Ethics granted approval for the larger program and a Project Within Program application for the data collected in this study was also approved. Plain language statements were provided for all principals and teachers inviting them to participate in the study. These documents provided the aims for the program, the expected commitment from participants and assurances of confidentiality. Consent forms were obtained from all participants and they were advised of their right to withdraw from the research at any time.

3.4 Participants

This research aimed to understand the practice of teachers whose students had achieved growth, in the hope that it would provide an insight into strategies that support the development of all students including those within the top-quartile of achievement. A purposive sample was chosen based on their suitability to illustrate the phenomenon of facilitating growth in all student achievement quartiles. Purposive or purposeful sampling seeks to identify cases from which the researcher can gain the most insight into a particular issue (Merriam, 2009; Patton, 2002). Although the focus of this investigation was on developing top-quartile students, the growth of all students must be a priority. It is for this
reason that a key selection criterion for participants was growth across all quartiles. Given that the stimulus for this investigation was an identified trend of flat achievement patterns for top students, the selection of teachers whose top students had seen achievement growth can also be seen as a unique purposeful sample. Such samples are chosen because they are atypical in relation to an identified phenomenon (Merriam, 1988).

Achievement scores from a previous study were analysed to identify teachers whose students had achieved growth in reading comprehension and numeracy across all achievement quartiles (see Care, Griffin, Zhang, & Hutchinson, 2014). These analyses identified 10 teachers from nine schools based on their reading comprehension results, and 18 teachers from eight schools based on their results in numeracy. In order to facilitate ease of access for observations and the planned focus group, 14 teachers from schools within the Melbourne metropolitan area were selected to participate; they ranged in experience from beginning teachers to those with more than 20 years experience. A breakdown of research participants is summarised in Table 1. For the purpose of confidentiality, all teachers were assigned numbers.

Table 1. Focus Group Participants

<table>
<thead>
<tr>
<th>Teacher number</th>
<th>Gender</th>
<th>Year level</th>
<th>Subject area</th>
<th>Teacher number</th>
<th>Gender</th>
<th>Year level</th>
<th>Subject area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Female</td>
<td>3/4</td>
<td>Reading Comprehension</td>
<td>8</td>
<td>Male</td>
<td>3/4</td>
<td>Reading Comprehension</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>5/6</td>
<td>Reading Comprehension</td>
<td>9</td>
<td>Male</td>
<td>5</td>
<td>Reading Comprehension/ Numeracy</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>3/4</td>
<td>Reading Comprehension</td>
<td>10</td>
<td>Male</td>
<td>6</td>
<td>Numeracy</td>
</tr>
<tr>
<td>4</td>
<td>Male</td>
<td>3/4</td>
<td>Numeracy</td>
<td>11</td>
<td>Female</td>
<td>6</td>
<td>Numeracy</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>3/4</td>
<td>Reading Comprehension/ Numeracy</td>
<td>12</td>
<td>Female</td>
<td>4</td>
<td>Numeracy</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>3/4</td>
<td>Numeracy</td>
<td>13</td>
<td>Female</td>
<td>3</td>
<td>Numeracy</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>5/6</td>
<td>Numeracy</td>
<td>14</td>
<td>Female</td>
<td>5/6</td>
<td>Numeracy</td>
</tr>
</tbody>
</table>

As the focus group took place at the end of the 2014 school year, it was necessary to postpone observations until the 2015 school year had commenced. This had an effect on the number of
participants that were available for classroom observations as some had either moved schools or taken leave from their position. In addition, some teachers had moved to a different year level. In cases where the teacher was moved to a year level that was still within the parameters of this study (Year 3-6), they were contacted to seek permission for researchers to conduct classroom observations. In two cases, the teachers had been moved to Early Years classrooms (Prep and Year 2) and a decision was made to visit the Year 2 classroom but not the Prep classroom. Finally, two teachers opted out of the study after the focus group and were not observed. This resulted in eight teachers taking part in the classroom observations, as summarised in Table 2.

<table>
<thead>
<tr>
<th>Table 2. Classroom Observation Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<tr>
<td>6</td>
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<td>7</td>
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<tr>
<td>8</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

3.5 Data collection

The use of a case study model allowed for the inclusion of a variety of data collection methods, which is seen as a major strength of case study research (Merriam, 1988; Yin, 2009). Similarly, the grounded theory approach allows the use of multiple methods and data sources (Charmaz, 2014). The research questions suggested the inclusion of some methods of data collection. The first question (To what do these teachers attribute the growth of their students) could have been addressed by either questionnaire or interview. The second question (How are the perceived contributing factors evident within their practice and within their classrooms?) was best served through direct classroom observation. Within the constructivist paradigm adopted, it was important to collect qualitative data in a way that a) was supportive of an emergent approach to design and analysis, b) captured the practice of these teachers within the naturalistic setting of the classroom and c) supported the
development of a richer understanding of the practice of participating teachers. The emphasis on gathering rich data aligns with both a qualitative case study design (Merriam, 1998) and a grounded theory approach (Charmaz, 2014).

A team of nine researchers were involved in the data collection; they had backgrounds in either education or educational psychology. Four methods were chosen for their combined ability to provide a richer understanding of the practice of participants: focus group discussions, planning documents, teacher questionnaires and classroom observations. A summary of the data collection is shown in Table 3.

### Table 3. Data collection schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus group discussion</td>
<td>November 2014</td>
</tr>
<tr>
<td>Development of observation tool</td>
<td>January 2015 – February 2015</td>
</tr>
<tr>
<td>Fieldwork</td>
<td>February 2015 – April 2015</td>
</tr>
</tbody>
</table>

#### 3.5.1 Focus group

Focus groups are generally defined in one of two ways. As group interviews the focus is on interactions between the researcher and the participant; others focus on the interactions between participants and therefore describe the method as a group discussion (Smithson, 2000). The use of focus groups is seen as a useful method for exploring both a topic that is not well understood (Parker & Tritter, 2006) as well as the perceptions, views or opinions of a chosen group of participants (Hydén & Bülow, 2003; Parker & Tritter, 2006). The method is seen as especially useful in the early stages of research as a way of understanding what participants think is relevant and can be used to assist in the design of future stages of a research project (Smithson, 2000). Participants are chosen because of a commonality that is of interest to the researcher and the focus for the group is generally on the topic that is being researched (Parker & Tritter, 2006). It has become increasingly popular as a method (Hydén & Bülow, 2003), perhaps due to the potential for collecting large amounts of data in a short period of time as compared to other methods such as one-to-one interviewing or observations (Parker & Tritter, 2006).

The purpose was to explore the perceptions of teachers, of particular interest were their perceptions of the key factors contributing to the growth of their students. The aim was to provide a basis from which future stages of the research would be conducted. The potential of generating ideas and new insights is a key advantage of the focus group method (Breen, 2006). The purposeful sample shared a commonality in regards to the growth of their students and this provided what Hyden and Bulow (2003) refer to as "a common communicative ground" for the group discussions (p. 311). An interview schedule was devised (see Table 4),
following the recommendations to begin with questions about participants’ experiences and end with more difficult key research questions (Breen, 2006; Winlow, Simm, Marvell, & Schaaf, 2013).
<table>
<thead>
<tr>
<th>Session</th>
<th>Focus</th>
<th>Key Questions</th>
<th>Method</th>
<th>Basis in literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Participants typical practice</td>
<td>Describe a typical lesson for you in the subject area for which you were chosen</td>
<td>Individual written responses followed by small group discussions</td>
<td>When studying professional practice it is often useful to consider collecting more structured data about detailed case examples</td>
</tr>
<tr>
<td>2</td>
<td>Participants perception of 'good teaching practice'</td>
<td>What worked well? How does their style compare to yours? What are some areas for development? What are some strategies you would recommend?</td>
<td>Individual written responses to short videos followed by small group discussions</td>
<td>It can be useful to include 'vignettes' as a basis for discussion and as a way of highlighting participants beliefs and actions</td>
</tr>
<tr>
<td>3</td>
<td>Participants perceptions of key factors contributing to the growth of their students</td>
<td>What factors do you feel contributed most to the growth of your lower ability students? Higher ability students? Average ability students?</td>
<td>Individual written responses followed by small group discussion and sorting activity</td>
<td>Card sorting is a method of facilitating discussion about choices, priorities and relationships between concepts</td>
</tr>
</tbody>
</table>
Typically, a large focus group is defined as having 10-12 participants (Winlow et al., 2013). As there were 14 participants in total, participants were organised into smaller groups of 3-4 for the purpose of discussion. Each small group was led by a researcher acting as moderator, while two additional researchers observed and provided notes to supplement those of the moderators. The aim was to provide increased opportunities for each participant to contribute to discussions.

Written responses from individual participants were completed prior to each group discussion and this served three purposes. First, in the absence of recording and transcripts, these responses provided a crosscheck for the written notes of researchers. Second, they served as a stimulus for small group discussions. Finally, having individuals respond in writing before discussions helped to address issues of participation that are associated with this method. An identified challenge of focus groups is the potential for some participants to dominate discussion, for some to avoid participating in discussions and for individuals to alter their responses so as to align with the normative discourse of the group (Smithson, 2000).

3.5.2 Fieldwork

The term fieldwork is often used to describe both observations and informal interviews or conversations that occur within a natural setting (Merriam, 2009). Leech and Onwuegbuzie (2008) refer to field data as all data that is collected during a qualitative study for the purpose of analysis. This can include documents, observation notes, transcripts, researcher notes and visual artefacts. For this study, field data collected was in the form of planning documents and notes from classroom observations.

Planning documents

Participants were asked to provide information in relation to the planning of observed lessons. In a discussion of the use of documents in qualitative research, Merriam (2009) distinguishes between those that are produced outside of the study and those that are generated by the researcher after the study has begun. One advantage of using existing documents is they are often easy to access (Merriam, 2009). The use of documents in qualitative studies can allow access to things that cannot be observed, thus providing "contextual richness" and data that is "grounded in the real world" which is especially important for naturalistic inquiries (Merriam, 1988, p. 109). Finally, documents are described as being less reactive to the influence of the researcher than other methods such as interviewing and observation (Merriam, 2009). As with any method, there are identified limitations to the use of documents. Documents that are not produced for the purposes of the study might be incomplete from a researcher perspective,
although this might also be useful as a way of alerting researchers to what is and is not included in existing documents (Merriam, 1988). Similarly, data collected from existing documents might not fit within existing research categories and frameworks; this is less of a concern when adopting an inductive approach to category building (Merriam, 1988) as this study did. Finally, issues of authenticity and accuracy must be explored when using documents (Merriam, 2009). In this case, observation field notes were used to crosscheck the planning documents in order to determine how accurately they described what was observed. In an effort to increase response rate, participants were given the option of providing existing planning documents or responding to questions provided by researchers in the form of a template. The questionnaire sent to participants was guided by the key concepts emerging from the focus group (see Table 5). Efforts were made to ensure the questions were open-ended and non-leading.

Table 5. Planning questionnaire

<table>
<thead>
<tr>
<th>Question</th>
<th>Emerging Concept</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>What were the planning considerations you made for this lesson? (e.g. assessment information, previous lesson)</td>
<td>Assessment</td>
<td>Looking for evidence of what factors influenced the planning decisions of these teachers</td>
</tr>
<tr>
<td>What is/are your learning intentions for the lesson?</td>
<td>Differentiation</td>
<td>Looking for evidence of single learning intentions or different intentions for different students as well as the basis for these intentions</td>
</tr>
<tr>
<td>Describe how your lesson will be structured. Describe the activities and any resources.</td>
<td>Differentiation, Grouping</td>
<td>Looking for evidence of differentiated tasks, differentiated instruction and the use of grouping within the lesson</td>
</tr>
<tr>
<td>Are students working in groups for the lesson?</td>
<td>Grouping</td>
<td>Looking for evidence of ability grouping, differentiated tasks,</td>
</tr>
<tr>
<td>Indicate how the groups were</td>
<td>Assessment</td>
<td></td>
</tr>
</tbody>
</table>
Of the eight teachers observed in this study, five provided their planning documents, two responded via the provided template and one did not provide any form of planning documentation.

Classroom observations
While the focus group provided an opportunity to collect data about teachers' perceptions and experiences, the use of classroom observations allowed a deeper understanding of their practice within the context of their classroom. Along with interviews, observations are a key method for collecting data within qualitative studies (Merriam, 2009). They differ from interviews in that they provide first-hand experience of a phenomenon rather than a second-hand account. Guba and Lincoln (1981) advise this method is particularly useful in aiding discovery in studies that are exploratory, not based on existing theoretical frameworks and seeking to understand complex phenomena. When planning for observations, it is necessary to make decisions about what to observe as it is not possible to observe everything that occurs in a context as complex as a classroom. In deciding what to observe, primary consideration should be given to the purpose of the study (Merriam, 2009). In this study, three considerations were most influential on the choice of what to observe. First, given the exploratory nature of the study, it was important that observations were open-ended enough to allow unanticipated behaviours to emerge. For this reason, although existing tools were considered, they were unsuitable for the purposes of this study. Second, following a grounded theory approach, data from the focus group were analysed and the emerging concepts provided the key categories around which observations were structured. Finally, the group of researchers worked together to identify behavioural indicators to describe each of the categories. These categories and behaviours served as 'sensitizing concepts' rather than 'definitive concepts' (Bowen, 2008; Hammersley, 2006) with the aim of describing behaviours we might see rather than defining all behaviours we wanted to see.

In addition to decisions about what to observe, consideration must be given to how data will be collected (Creswell, 2003; Merriam, 2009). Again this requires alignment with the purpose of the study, but issues of practicality must be taken into account. The aim of developing an understanding of the practice of these teachers suggested collecting qualitative data rather than quantitative. Video recording, and to a lesser extent audio recording, provides a more complete record of the event being studied, and therefore allows for an easier analysis.
(Merriam, 2009); however, in this study, time and resource constraints prohibited these as viable methods for data collection. Therefore, it was necessary to devise a method for collecting field notes based on emerging categories and associated behavioural indicators. While it was possible to produce narrative field notes from observations, concerns over consistency and coverage led to a method that would provide more structure for the collection of data. Cresswell (2003) describes the use of an *observational protocol*, including notes and demographic information, as a useful tool when conducting multiple observations. Guba and Lincoln (1981) discuss various methods for recording observational data including: category systems, time schedules, checklists and running notes. Ultimately, the authors advocate for the freedom to "generate other ways of recording the information" as the researcher sees fit in relation to the needs of the study (Guba & Lincoln, 1981, p. 206).

The tool that was developed for recording observations (Appendix 1) provided information about the physical environment of the classrooms, demographic information about the subject area, year level and observer as well as teacher and school codes. A grid was devised using five-minute intervals and sections for teacher and student behaviours. While we were predominantly interested in teacher behaviour, in order to capture what was happening during any periods of group work, it was necessary to note not only what a teacher was doing but also in what context. For example, the grid allowed observers to note when the teacher was moving about the room checking in with students who were working in small groups. This system also allowed observers to identify and describe the tasks each group was working on as a way of understanding the teacher's approach to differentiation. The behavioural indicators described earlier served as guides for coding the behaviour that was observed with space provided for further notes to add detail. Finally, observers used the completed grids to produce detailed narrative field notes to aid the analysis.

The limitations of observation include participant reactivity and observer bias (Guba & Lincoln, 1981; Merriam, 2009). First, there are concerns over how the presence of an observer affects the social situation they are observing, however, it has been argued that social environments are quite stable (Guba & Lincoln, 1981) especially when observed over a period of time (Merriam, 2009). In this study, each participant was observed for two lessons in an attempt to establish consistency of practice while also working within the constraints of time and resources. In a qualitative study such as this, a certain amount of researcher subjectivity is inevitable. It is therefore important to be aware of this and monitor how it may affect the collection and analysis of data (Merriam, 2009). Training is one way to address the issues of selectivity and subjectivity (Merriam, 2009). In this study, the observational protocol provided a guide to focus the attention of observers, and training was conducted to improve their skills.
3.6 Analysis

This study adopted an inductive approach to analysis that is suited to the development of conceptual categories (Merriam, 1988) and in keeping with a grounded theory approach (Strauss & Corbin, 1998). In qualitative research, analysis begins as soon as the first data is collected. Merriam (1988) distinguishes between data analysis during data collection and the more intensive analysis that occurs after collection has finished. Analysis during data collection is useful in directing the researcher's attention to emerging themes and can be used to inform future data collection (Charmaz, 2014; Merriam, 1988; Strauss & Corbin, 1998). In this study, the patterns that emerged from an analysis of the focus group data played an instrumental role in developing a tool for subsequent observations.

As a first step in the process, data were prepared for analysis. Raw data was entered into Word and Excel and sorted for easy access. Observation grids and task resources were scanned and sorted in the same way. Strauss and Corbin (1998) describe the use of open coding to classify the data, with the aim of discovering emerging concepts. Concepts are then grouped at a more abstract level to form categories and subcategories. This process uses both convergent and divergent thinking to determine how the data fits into emerging conceptual categories and how those categories are distinct and different from each other. Both NVivo and Excel were used to discover emerging categories from the focus group data collected in this study and these categories were carried into the analysis of field work data.

Much of what Merriam (1988) describes as 'fleshing out categories' (Merriam, 1988, pp. 135-136) aligns with the grounded theory approach to developing categories and subcategories. While Strauss and Corbin (1998) describe the use of axial coding, Charmaz (2014) prefers a less formal and prescribed process. The development of categories in this study took place primarily in the analysis of field work data. Based on the data collected, some categories were able to be more fully developed than others. Along with coding, grounded theory uses researcher notes (memos) and diagrams as an aid to analysis (Charmaz, 2014; Strauss & Corbin, 1998). For the purposes of this study, both written notes and visuals were used throughout the analysis and recorded in researcher notebooks.

A higher level of analysis is needed in studies that aim to develop theory. In these studies, "an analyst reduces data from many cases into concepts that can be used to explain, in a general sense, what is going on" (Strauss & Corbin, 1998, p. 145). This involves alternating between inductive and deductive thinking as categories are developed and new data are analysed against them (Merriam, 1988; Strauss & Corbin, 1998). In this final stage of analysis, a central or core category is identified and its relationship to all other categories is defined. In this study, this step culminated in the development of a conceptual framework to describe the perceptions and practices of these teachers.
CHAPTER 4
FINDINGS AND ANALYSIS
Chapter 4 - Findings and analysis

4.1 Introduction

The data collected from the focus group and subsequent field work were analysed with the aim of developing a richer understanding of what might contribute to the growth of top-quartile students in heterogeneous classrooms. This chapter describes the conceptual categories that arose from this analysis, which was driven by the following research questions, as discussed in Chapter 3:

RQ1  *To what do these teachers attribute the growth of their students?*

RQ2  *How are the perceived contributing factors (RQ1) evident within their practice and within their classrooms?*

The teachers who took part in the focus group were asked to provide information regarding the factors they perceived contributed to the growth of students. An analysis of their responses led to the development of three conceptual categories: providing opportunities for growth, establishing an environment for growth and developing self-regulated learners. These categories are illustrated in Figure 1 and described in this chapter.

Figure 1. Conceptual categories

As discussed in the previous chapter, the field-work data provided an opportunity to gain a deeper understanding of the practice of participating teachers within the natural context of the classroom. The data was coded by incident, and then compared against emerging categories.
Chapter 4: Findings and analysis

and subcategories. As Charmaz (2014) points out, this method of coding is often more appropriate for observational data than line-by-line or word-by-word coding due to the fact that data collected in field notes has already been interpreted and framed by the observer to some extent. The aim was to understand the teachers' behaviour in reference to their perceptions of what contributed to the growth of students. Both common elements as well as areas of difference between these teachers were identified. The overall purpose was to understand in more detail the way these teachers might have enabled growth in their top-quartile students, which will be discussed in more detail in the next chapter.

4.2 Providing opportunities for growth

The teachers in the focus group described a purposeful and planned approach to student growth that required an awareness of the diverse needs within their classroom, a commitment to the development of all students and planning that reflected both. The provision of opportunities for growth, as observed in the planning for and implementation of lessons, involved the use of continuous assessment procedures to identify student needs as well as a willingness and ability to target or adapt tasks and teaching to meet both identified and emerging needs. Figure 2 illustrates the elements of this conceptual category.

Figure 2. Providing opportunities for growth - conceptual category
### 4.2.1 Using assessment data

The use of assessment data was perceived as a key factor in the growth of students. Teachers described a variety of uses, including identifying student need, grouping students, setting learning goals and monitoring needs within lessons. As a planning tool, assessment was discussed in terms of identifying student need. Many of these teachers spoke of need in terms of students' zone of proximal development (ZPD). The responses below provide an insight into the importance placed on assessment of student need.

> Lessons were planned to particularly meet the ZPD of children, with fluid grouping and specific assessment to inform them
> Teacher 6

> Using assessment data to identify student ZPD and then targeting lessons towards meeting their learning goals
> Teacher 12

> Use of data to locate child's ZPD and plan intervention at student's point of need
> Teacher 2

The identification of student need in terms of individual development (as implied by references to ZPD) suggests a developmental approach to teaching (see Hutchinson et al., 2014). An emphasis on learning and development was seen in the responses of teachers who spoke of establishing a learning focus or goal that was based on the needs identified through assessment. Other teachers indicated the need for differentiated learning goals (Teacher 14 and Teacher 5), which suggest an attempt to plan for different levels of development within classrooms. In addition to planning, several teachers indicated that close monitoring of students through continuous and varied assessment procedures was key to the growth of their students (Teachers 1, 5, 8 and 12).

Field-work data provided strong evidence of widespread and continuous classroom level assessment with some evidence of the role that system level assessment played in the practice of these teachers. Table 6 provides a summary of the way assessment was used, with practices either observed by researchers or reported by teachers during the observed lessons. Data about the use of system level assessment, such as externally developed testing, was limited. Several teachers spoke of the use of school-wide testing (Teachers 1, 2, 4, 6 and 7), with the results recorded in student files. As the observations took place at the beginning of
the school year, some teachers indicated they made use of testing information from the previous year to assist in initial grouping of students.

Table 6. Use of assessment in observed lessons

<table>
<thead>
<tr>
<th>Assessment type</th>
<th>Used to</th>
</tr>
</thead>
<tbody>
<tr>
<td>System level assessment</td>
<td></td>
</tr>
<tr>
<td>Whole school testing (e.g. Pat Maths)</td>
<td>• group students</td>
</tr>
<tr>
<td></td>
<td>• monitor student progress</td>
</tr>
<tr>
<td>Classroom level assessment</td>
<td></td>
</tr>
<tr>
<td>Pre-testing</td>
<td>• group students</td>
</tr>
<tr>
<td></td>
<td>• plan lessons</td>
</tr>
<tr>
<td>Informal assessment (questioning, observation, work samples)</td>
<td>• group students</td>
</tr>
<tr>
<td></td>
<td>• plan lessons</td>
</tr>
<tr>
<td></td>
<td>• monitor student progress</td>
</tr>
<tr>
<td></td>
<td>• respond to student need</td>
</tr>
</tbody>
</table>

The use of classroom level assessment was far more prominent, particularly the teachers' use of informal assessment methods. Two teachers (6 and 11) spoke of the use of pre-testing as an aid to grouping and planning of lessons; whether other teachers also used this method of assessment was unclear based on the data collected. All teachers actively monitored the understanding and progress of students throughout their lessons through the use of questioning and observation. The practice of teacher 'roving', as referred to by the teachers, was a distinct feature of all observed lessons. It involved the teacher moving around the room during task completion and served the dual purpose of monitoring and intervening.

4.2.2 Targeting diverse learning needs

The identification of student developmental needs influenced the selection of tasks and teaching methods for many of these teachers. Their responses indicated a purposeful attempt to target both learning tasks and teaching to meet these needs.

Targeting tasks

Within the focus group, all but one of the teachers spoke of the importance of tasks and resources in facilitating the growth of their students. While there was a consensus that tasks and resources contributed to student growth, there were distinct differences in the responses of teachers (summarised in Table 7). Some spoke of differentiated tasks, others described the use of open-ended tasks and others spoke of the importance of resources. In addition, there were clear differences in how these factors were perceived in relation to the growth of high-ability students and low-ability students.
From the summary, it appears that opportunities to consolidate knowledge through repetition and providing adequate support were seen as important for lower ability students. For higher ability students, the emphasis was on opportunities to deepen understanding, apply knowledge and skills, share strategies and ideas and challenge their thinking. As this is a summary of perceived factors contributing to growth, and not a summary of teacher practice, it was unclear whether teachers who differentiated tasks for their students also made use of open-ended tasks (and visa versa). As a result, a clear understanding of how these teachers selected and allocated tasks within lessons was a priority for the subsequent field-work phase.
<table>
<thead>
<tr>
<th>Table 7.  Tasks as a contributing factor to student growth</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Important for all students</strong></td>
</tr>
</tbody>
</table>
| Differentiated tasks | • Differentiated tasks/activities (Teachers 2, 6, 10 and 12)  
  • Differentiate to 'engage' all learners (Teachers 2 and 6)  
  • Differentiation "may be as simple as higher/lower expectations, or a completely different task" (Teacher 10)  
  • Daily mental maths, levelled according to student ability (Teacher 11) | • Daily mental maths at their level (Teaches 7 and 11) |
| Open-ended tasks | • Open tasks that are accessible to all students (Teachers 11 and 14) | • "Develop understanding and apply it through open-ended questions, problem solving and real-life application" (Teacher 5)  
  • "Open-ended tasks which promote discussion, problem solving and sharing of strategies" (Teacher 7)  
  • "Open problems to solve that allowed me to push these students to find more/different solutions and not just take the 'easy' or obvious solution" (Teacher 11) | • "Open problems, but more support to complete them" (Teacher 11) |
| Resources | • Careful text selection (Teacher 5) | • Access to all materials (Teacher 4)  
  • Using concrete materials (Teachers 7, 2, 13, 14)  
  • Providing visual prompts and tools (Teachers 2 and 13) |
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The observed lessons provided more detail about the different approaches to task allocation. Table 8 shows that six of the teachers, at some point, assigned a single task to all students (Teachers 1, 4, 7, 8, 10, 11); while five teachers, at some point, assigned different tasks to different groups of students (Teachers 1, 2, 4, 6, 7, 10). In addition, it describes an even split between those teachers that used a combination of these two approaches and those that used only one approach. It was anticipated that teachers who used ability grouping might only assign different tasks for different groups; however, the data indicated this was not always the case. Of the four teachers that used only one approach to task allocation, there was an even split between those who only assigned a single task for all (Teachers 8 and 11) and those who only assigned different tasks for different groups (Teachers 2 and 6). Likewise, those teachers who used a combination of the two approaches represented teachers that used ability grouping (Teachers 1 and 7) and those that did not (Teachers 4 and 10). Also, while all teachers offered extension tasks within their lessons (as an additional task for those that finished the assigned task), half of them offered it to all students while the other half offered it to a select group of students (presumably those identified as high ability).

Table 8. Task allocation in observed lessons

<table>
<thead>
<tr>
<th></th>
<th>Number of teachers (n=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same task for all students</td>
<td>6</td>
</tr>
<tr>
<td>Different tasks for different groups</td>
<td>5</td>
</tr>
<tr>
<td>Used a combination of same and different tasks</td>
<td>4</td>
</tr>
<tr>
<td>Used one type of task only</td>
<td>4</td>
</tr>
<tr>
<td>Extension task offered to all students</td>
<td>4</td>
</tr>
<tr>
<td>Extension task offered to selected students</td>
<td>4</td>
</tr>
</tbody>
</table>

* As some teachers planned more than one task per lesson, they may have used both approaches to task allocation. As a result, an individual teacher may be represented in both categories.

Although the focus group teachers did not identify grouping practices as a contributing factor in student growth, within the observed lessons the students were often grouped for the completion of assigned tasks. Table 9 describes the different approaches to grouping for task completion that were observed. The opportunity for students to choose whom they would work with was common within these classrooms; however, it was often secondary to the teacher-defined group. For example, a student would pair up with someone of their choice within the confines of the teacher defined ability based group. Of the five teachers who instructed students to work independently on tasks, only one (Teacher 7) was also observed to
implement similar-ability grouping. It is worth noting that even when working within groups or pairs, students were expected to complete all written work individually.

Table 9. Grouping for task completion in observed lessons

<table>
<thead>
<tr>
<th>Group type</th>
<th>Number of teachers (n=8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher selected small groups (similar ability)</td>
<td>4</td>
</tr>
<tr>
<td>Teacher selected pairs (mixed ability)</td>
<td>2</td>
</tr>
<tr>
<td>Student selected pairs or small groups</td>
<td>7</td>
</tr>
<tr>
<td>Individual students</td>
<td>5</td>
</tr>
</tbody>
</table>

**Targeting teaching**

Just as the identification of student developmental needs influenced the selection of tasks, so too did it inform the focus of teaching. Several teachers identified the importance of teaching driven by assessment and aimed at identified student needs (Teachers 1, 6, 7, 9 and 11) as important to the growth of all students. Teachers 7 and 3 also advocated the use of small teacher led focus groups to target teaching. In addition, some teachers spoke of the necessity of responding to needs that arose within the lesson. This included "checking in with each student and explaining things" (Teacher 12) and providing "one-on-one teaching when needed" (Teacher 1). It is in the described focus of teaching interventions that we see a clear difference between lower-ability and higher-ability students. Table 10 summarises the responses of teachers who identified teaching practices they believed contributed to the growth of students. A similar pattern to the selection of tasks was seen. For high-ability students, the emphasis was on challenging thinking and developing understanding; for lower-ability students the focus was on repetition, support and consolidation. While there was a general consensus about practices that support the growth of low-ability students, the development of higher-ability students was more contentious. In particular, two points of disagreement arose within discussions. First, while some teachers advocated the use of high-ability students as peer mentors, others disagreed strongly with this practice. Second, there was debate over whether to extend the learning of high-ability students by accelerating them through the curriculum or by providing opportunities for increasing the breadth and depth of year level content.
Table 10. Teaching as a contributing factor to student growth

<table>
<thead>
<tr>
<th>Important for high ability students</th>
<th>Important for low ability students</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;stretching their knowledge and skills, introducing new concepts, challenging them to learn&quot; (Teacher 6)</td>
<td>&quot;these students tend to have gaps in their learning and need more support, skills and strategies&quot; (Teacher 11)</td>
</tr>
<tr>
<td>&quot;scaffolding learning to ensure solid understanding of advanced concepts&quot; (Teacher 9)</td>
<td>&quot;back to basics&quot; approach and &quot;extra support&quot; (Teacher 13)</td>
</tr>
<tr>
<td>&quot;focus on higher order thinking&quot; (Teacher 1)</td>
<td>&quot;taking topics back to basics and giving one-on-one support where possible&quot; (Teacher 12)</td>
</tr>
<tr>
<td>&quot;questioning used to build understanding and develop higher order thinking, building on each other’s understandings&quot; (Teacher 5)</td>
<td>&quot;lots of teacher support&quot; (Teacher 3)</td>
</tr>
<tr>
<td></td>
<td>&quot;being patient and willing to repeat instructions and offer learning in different ways&quot; (Teacher 4)</td>
</tr>
<tr>
<td></td>
<td>&quot;revisiting concepts often enough&quot; (Teacher 8)</td>
</tr>
<tr>
<td></td>
<td>&quot;repetition&quot; (Teacher 2)</td>
</tr>
</tbody>
</table>

All observed lessons were structured around what the teachers referred to as a 'whole-part-whole' approach. This involved a whole class approach to revision, introduction of new content and instructions for assigned tasks. Tasks were then completed either independently or within small groups, followed by a whole class reflection on learning. Many also used small teacher focus groups for the explicit teaching of skills and strategies, scaffolding task completion or revision. All teachers who used similar ability grouping also used planned teacher focus groups (Teachers 1, 2, 6, 7). Two teachers (Teachers 4 and 11), who did not use similar ability grouping, implemented unplanned teacher focus groups to address emerging needs by providing additional support for students who were having difficulty with the assigned task.

The practice of teacher 'roving' during the completion of tasks was a distinct feature of all observed lessons. Table 11 describes the two functions of monitoring and intervention this practice served.
Table 11. Functions of teacher roving in observed lessons

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Task entry</td>
<td>• Scaffolding or explicit teaching to individuals or small groups</td>
</tr>
<tr>
<td>• Task progress</td>
<td>• Providing encouragement</td>
</tr>
<tr>
<td>• Behaviour</td>
<td>• Providing feedback on the task</td>
</tr>
<tr>
<td>• Understanding</td>
<td>• Providing feedback on behaviour</td>
</tr>
<tr>
<td>• Use of resources</td>
<td>• Reminding students of expectations</td>
</tr>
</tbody>
</table>

The selection of tasks, the use of grouping and the practice of roving were instrumental to the way these teachers responded to and catered for groups of students with diverse starting points or learning needs. Figure 3 represents the various ways these teachers targeted student learning needs within observed lessons. Individual teachers implemented a selection of the identified strategies but not necessarily all of them. As the figure indicates, when a single task was chosen for all students, there were usually adjustments made during implementation to cater for different students. These adjustments to tasks and resources were aimed at either increasing the challenge or the level of support to meet the needs of individuals or groups of students. Similarly, the use of differentiated questioning during whole class instruction served the purpose of extending some students and scaffolding others.
Figure 3. Targeting diverse learning needs in observed lessons

Planning (pre-lesson)
- Grouping by similar ability/need
- Planned teacher focus group
- Different tasks for different groups

Monitoring (within lesson)
- Same task for all
- Adjusting level of questions
- Adjusting task

Responding (within lesson)
- Adjusting resource
- Adjusting support
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4.2.3 Being a professional

One final subcategory relates to the role of the teacher as a professional. Teachers who took part in the focus group identified this as an area that contributed to the growth of students, describing it in one of three ways: preparation, teacher knowledge and commitment to improvement. All but one teacher spoke in some way about the importance of careful planning and preparation for lessons. This involved using assessment data to identify needs and target tasks and teaching, as previously discussed. In addition, it referred to having appropriate resources prepared and ready for use during the lesson (Teachers 5 and 3). Other teachers identified the importance of teacher knowledge, including curriculum and content knowledge (Teachers 5, 4 and 3) and knowledge of developmental stages (Teacher 5). Finally, four of the teachers identified a commitment to improving their professional practice as key to student growth. This was done through reflection (Teacher 5), engaging with other professionals (Teachers 5 and 9) and seeking feedback on their practice (Teachers 3, 5 and 14).

As this subcategory represented elements such as teacher knowledge and behaviour that occurred either before or after lessons (e.g. planning decisions), it is unsurprising there was minimal evidence collected during the field work in relation to this. In addition, the planning documents were varied in form and in the level of detail and complexity they provided. While the teachers may have indicated that careful planning was necessary for the growth of students, the data collected within the fieldwork did not clarify how that planning was done. In general, it can be said that the teachers implemented what was contained in their planning documents.

4.3 Establishing an environment for growth

All focus group participants identified the importance of establishing a classroom environment that was conducive to learning. This involved managing the classroom, supporting learners, encouraging risk taking and attempts to engage and motivate learners. Figure 4 presents the different aspects of this conceptual category, followed by a discussion of these aspects in relation to the data collected.
4.3.1 Establishing expectations, routines and procedures

Several teachers identified the importance of having high expectations of students (Teachers 2, 6 and 9), having an expectation that students should aim for deep understanding (Teachers 1, 8 and 11) and expect to be challenged (Teachers 3, 12, 13, and 14). There was also support for the need to establish a safe environment (Teachers 5, 6, 7 and 10) with clear expectations of student behaviour. The following response illustrates the perceived link between expectations and the environment:

"Develop a friendly, safe and encouraging learning environment from day 1, expect nothing less and refuse to accept put downs, negative comments, etc. Students feel safe to take risks." Teacher 10

Within the lessons observed, there was evidence of teachers communicating their expectations of students' behaviour, quality of work and interactions with others. The emphasis of these communications frequently centred on students' responsibility to themselves and to the group rather than on compliance to avoid negative consequences. Four of the teachers (1, 5, 7 and 10) believed that maintaining a structured and consistent environment contributed to the success of their students. In observations, there was evidence
that establishing routines, procedures and rules was an important component of setting up the learning environment. Evidence of routines and established procedures was seen in the following:

- Transitioning into and out of group work
- Structuring of lessons
- Accessing resources during task completion
- Completing tasks
- Participating in discussions
- Working in groups

At times procedures would be explicitly taught, for example the setting out of written work. In other cases, the teacher would provide reminders about previously established rules, procedures or routines, such as collecting resources or accessing help during group work. Finally, there was evidence that some routines and procedures had been established and did not require any observable behaviour on the part of the teacher. This was especially true of transitions between whole group activities and small group or individual work. Given that the observations took place early in the school year, several teachers commented they were still in the process of teaching routines and procedures to this new group of students. For example, Teacher 6 told researchers at this time of year the focus of lessons was often centred on establishing expectations, routines and procedures more than on content.

### 4.3.2 Establishing classroom norms

An analysis of focus group responses highlights common and interrelated beliefs held by this group of teachers. Essentially respondents saw the importance of establishing a safe environment (Teachers 5, 6, 7 and 10) in which all students were expected to learn and grow (Teachers 2, 4, 6, 10, 11, 12, 13 and 14); learning was possible when students were appropriately challenged (Teachers 3, 6, 12, 13 and 14) and willing to make mistakes (Teachers 2, 3, 6 and 11).

Unsurprisingly, the eight observed teachers varied in terms of personality, methods and teaching styles. Despite this, there were clear commonalities about what was valued and promoted. Table 12 describes these common classroom norms and the teacher behaviours that were used as evidence. These are characteristics found in the classrooms observed, although the degree to which each was apparent varied depending on the teacher and lesson observed.
Table 12. Classroom norms in observed classrooms

<table>
<thead>
<tr>
<th>Teacher behaviour:</th>
<th></th>
</tr>
</thead>
</table>
| Creating a positive and supportive atmosphere | - Used humour  
- Planned for student engagement (use of games, varied resources, ICT, etc.)  
- Expressed to students and researchers the importance of 'having fun'  
- Encouraged or provided the opportunity for students to work together and support each other  
- Had conversations with students about their lives outside the classroom  
- Provided frequent encouragement and positive feedback to students (related to task or behaviour)  
- Addressed negative or unsupportive behaviour (e.g. when one student accused another of cheating) |
| Valuing effort over correctness/completeness | - Praise was given for effort, participation, persistence and thinking  
- Welcomed different ideas, ways of doing things, suggestions and answers |
| Creating a community of learning | - Encouraged students to share ideas, knowledge, skills and questions with the group  
- Encouraged and facilitated group discussions, brainstorming and debates as a way of sharing  
- Answers to individual student questions were often shared with the whole group  
- Feedback on an individual student's work was often shared with the whole group as a means of helping others  
- Actively involved students in the learning process (e.g. review, brainstorming, discussion, using students to model thinking and strategy use)  
- Provided opportunities for students to work together  
- Emphasised the students' responsibility to others in the group  
- Encouraged and praised behaviours that benefited the group (e.g. patience, cooperation, fairness, supportiveness) |

4.3.3 Providing support for learners

For these teachers, an essential element of establishing an environment for learning was ensuring that learners were adequately supported. Table 13 illustrates the various sources of support that these teachers felt contributed to the success of their students. Five teachers saw teacher support as a key contributing factor for low-ability students, while only one teacher identified this as a key factor for high-ability students. The other sources of support had an even number of responses in relation to the different ability groups.
Table 13. Support for learners as a contributing factor to student growth

<table>
<thead>
<tr>
<th>Support Type</th>
<th>Participating Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing students</td>
<td>Teachers 1, 3, 5, 9, 13</td>
</tr>
<tr>
<td>Teacher support</td>
<td>Teachers 1, 3, 4, 5, 11, 12, 13</td>
</tr>
<tr>
<td>Additional/external support</td>
<td>Teachers 7, 8, 9, 12, 14</td>
</tr>
<tr>
<td>Peer support</td>
<td>Teachers 2, 3, 4, 5, 7, 8, 10, 11</td>
</tr>
</tbody>
</table>

Several teachers spoke about getting to know their students’ learning styles and social-emotional needs as well as their academic needs. This broader conception of student need is seen in comments that advocated "knowing your students and how they learn" (Teacher 3) and "catering for all abilities, learning styles, moods, disabilities, likes, etc." (Teacher 13). Five teachers discussed the benefits of having access to additional sources of support for their students, either extra staff to support and extend individual learners or professional peers to assist in planning.

Many of these teachers regarded the support of peers as a key factor in the success of students. Table 14 provides an insight into teachers' perceptions of this contributing factor. The positive effect of peer support was seen as especially important for the success of high-ability students. Students were seen to support the learning of their peers not only by sharing their knowledge and skills, but also by motivating them to learn.
Table 14. Peer support as a contributing factor to student growth

<table>
<thead>
<tr>
<th></th>
<th>Important for all students</th>
<th>Important for high ability students</th>
<th>Important for low ability students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaboration</td>
<td>• &quot;Collaborative approach in the classroom, initiated with Effective Classroom Program at the start of the year&quot; (Teacher 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• &quot;Collaborative groups - knowledge base is shared and thinking.&quot; (Teacher 11)</td>
<td>• Collaborative learning/opportunities (Teachers 10 and 2)</td>
<td>• &quot;Collaborative group work allowed for a shared knowledge base, but also encouraged the students natural competition among themselves as to what they could/would achieve&quot; (Teacher 11)</td>
</tr>
<tr>
<td>Peer mentor/ teaching</td>
<td></td>
<td>• &quot;Peer teaching and learning&quot; (Teacher 3)</td>
<td></td>
</tr>
<tr>
<td>Sharing ideas and</td>
<td>• &quot;Cooperative small group work to make the most of all the skills and knowledge students bring to the classroom&quot; (Teacher 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>knowledge</td>
<td></td>
<td>• &quot;Open ended tasks which promote discussion, problem solving and sharing of strategies&quot; (Teacher 7)</td>
<td>• &quot;Sharing of strategies&quot; (Teacher 7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Questioning used to build understanding and develop higher order thinking, building on each others understandings&quot; (Teacher 5)</td>
<td></td>
</tr>
<tr>
<td>Encouragement</td>
<td></td>
<td></td>
<td>• &quot;Encouraging peers in mixed ability groups&quot; (Teacher 10)</td>
</tr>
</tbody>
</table>
Within observed lessons, the two main sources of support were the classroom teacher and peers as described in Table 15. Both teacher and peer support were evident in all classrooms observed, while only two of the classrooms provided evidence of additional sources of support.

Table 15.  Support for learning in observed lessons

<table>
<thead>
<tr>
<th>Source</th>
<th>Examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher</td>
<td>• Teacher focus groups (teacher led small groups)</td>
</tr>
<tr>
<td></td>
<td>• Teacher responding to student questions</td>
</tr>
<tr>
<td></td>
<td>• Teacher roving during small group/individual work</td>
</tr>
<tr>
<td></td>
<td>• Teacher providing prompts, encouragement, feedback</td>
</tr>
<tr>
<td></td>
<td>• Teacher modeling procedures, strategies and thinking</td>
</tr>
<tr>
<td></td>
<td>• Teacher providing explicit teaching of content</td>
</tr>
<tr>
<td>Peers</td>
<td>• Students working together during task completion</td>
</tr>
<tr>
<td></td>
<td>• Students seeking help from their peers</td>
</tr>
<tr>
<td></td>
<td>• Students offering help to their peers</td>
</tr>
<tr>
<td></td>
<td>• Students providing positive feedback to each other</td>
</tr>
<tr>
<td></td>
<td>• Students sharing ideas, knowledge and skills with their peers</td>
</tr>
<tr>
<td>External/Additional</td>
<td>• Students attending extension lessons outside of the classroom</td>
</tr>
<tr>
<td></td>
<td>• Additional support staff providing support within the classroom</td>
</tr>
</tbody>
</table>

4.3.4 Engaging and motivating students

One of the greatest areas of consensus was in relation to the concept of engagement. All teachers identified at least one contributing factor that was related to student motivation or engagement, with many identifying multiple factors around this concept. There was strong support for the belief students who were engaged and motivated to learn had greater success. A summary of these responses is presented in Table 16. Student engagement in lessons was important for many of these teachers and was a consideration of planning tasks and teaching. Interestingly, competition as a source of student motivation was identified by three of the four male teachers within the focus group (no females cited this as a factor). Providing the students with some element of choice and relating learning to their real life were also seen as aiding student motivation. The building of students' confidence in their ability to succeed was seen as especially important to the success of lower-ability students. Finally, some of the teachers spoke of developing students' positive attitudes towards learning.
<table>
<thead>
<tr>
<th>Student motivation/affect as a contributing factor to student growth</th>
<th>Important for all students</th>
<th>Important for high ability students</th>
<th>Important for low ability students</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Student engagement</strong></td>
<td>• Having engaging activities (Teachers 8, 9, 10 and 12), engaging lessons (Teachers 6, 7 and 12)</td>
<td>• &quot;Finding interesting topics/texts to read that were age and level appropriate&quot; (Teacher 2)</td>
<td>• Having engaging and stimulating lessons (Teacher 6)</td>
</tr>
<tr>
<td></td>
<td>• Using a variety of resources (Teachers 5 and 7) and ICT (Teachers 7, 9 and 11) to increase engagement</td>
<td>• Engaging lessons that &quot;challenged&quot; them (Teachers 2 and 6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Using a range of groupings (Teacher 2) and teaching strategies (Teachers 9 and 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Competition</strong></td>
<td>• &quot;Making success a focus, because they want to 'catch up' to the top group&quot; (Teacher 4)</td>
<td>• An optimal level of 'competitive spirit' (Teachers 8 and 10)</td>
<td></td>
</tr>
<tr>
<td><strong>Student choice</strong></td>
<td>• Allowing for an element of choice (Teachers 7 and 14)</td>
<td>• Providing for some student choice in their learning (Teachers 3 and 5)</td>
<td>• &quot;Having the students think about what they know and what they want to learn&quot; (Teacher 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• &quot;Having the students think about what they know and what they want to learn&quot; (Teacher 4) and &quot;what they would like to explore&quot; (Teacher 14)</td>
<td></td>
</tr>
<tr>
<td><strong>Building self-efficacy</strong></td>
<td>• Students having the confidence to take risks (Teacher 1)</td>
<td>• Students &quot;reaching their set goals&quot; (Teacher 3)</td>
<td>• Setting high but achievable goals (Teachers 3 and 11) in order to build their confidence in their ability to succeed (Teachers 2, 3 and 4)</td>
</tr>
<tr>
<td></td>
<td>• Providing opportunities for students to experience success (Teachers 12 and 13)</td>
<td></td>
<td>• Building their &quot;confidence to speak and take risks&quot; (Teacher 1) by &quot;valuing their contributions&quot; (Teacher 8)</td>
</tr>
<tr>
<td><strong>Relevance of learning</strong></td>
<td>• Relating learning to the students' real life (Teachers 7, 13 and 14)</td>
<td>• Relating learning to the students' real life (Teachers 5 and 7)</td>
<td>• Relating learning to the students' real life (Teachers 3 and 14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Making links to prior learning (Teacher 14)</td>
</tr>
<tr>
<td><strong>Positive attitude to learning</strong></td>
<td>• &quot;Showing interest/passion for the topic myself&quot; (Teacher 8), teacher enthusiasm (Teachers 3 and 7), student enthusiasm for learning (Teacher 12)</td>
<td>• Challenging and inspiring students to learn (Teacher 2)</td>
<td>• &quot;Engaging and stimulating lessons that make them want to learn and be proud of their achievements&quot; (Teacher 6)</td>
</tr>
</tbody>
</table>
Teachers made a variety of attempts to engage and motivate students to participate in observed lessons and assigned tasks. These included:

- Providing a variety of tasks and flexible grouping within lessons
- Using games and ICT
- Linking learning to the students' real life and to past/future learning
- Providing opportunities for student choice (e.g. groups and where to work)
- Providing opportunities for students to work with their peers
- Providing encouragement, positive feedback and praise for effort

4.4 Developing self-regulated learners

In addition to providing opportunities for the growth of all students and establishing an environment for growth, these teachers described a practice in which the responsibility for growth was shared. In line with constructivist learning theories, their responses indicate a belief that students should be encouraged to take responsibility for and be active in their own learning. This collaborative approach to learning was perceived by many as a key-contributing factor to the growth of students. Figure 5 illustrates this conceptual category.

Figure 5. Developing self-regulated learners - conceptual category

All participating teachers discussed the importance of developing students' skills in this area. Teacher 5 spoke of building "a culture of taking responsibility for their learning and
challenging themselves”. Others agreed with the importance of students taking responsibility for their own learning (Teachers 2, 3, 8, 11 and 14).

Goal setting, as an element of self-regulated learning, was approached in different ways. While two of the teachers spoke of involving students in the goal setting process (Teachers 4 and 13), all other responses related to goals, expectations and learning intentions that had been set by the teacher (Teachers 1, 4, 5, 6, 7, 8 and 14). As discussed earlier, it was common practice in the observed classrooms for teachers to make explicit the expectations for student behaviour. In addition, many discussed the purpose of the lesson and the goals or intentions for students (either in terms of the task or in terms of their level of understanding or skill). Some goals directly related to the content and others related to the students’ interpersonal skills, persistence and work skills.

The development of metacognitive skills, as discussed by these teachers, included providing opportunities for students to reflect on their learning (Teachers 2, 3, 7 and 14). Teachers 3 and 14 emphasised the importance of asking students to reflect on their experiences in completing tasks in order to provide feedback to teachers. Despite the perceived importance of reflection, in observed lessons this reflection was usually limited to five minutes and often teacher directed. All reflections were done in the form of a group discussion. The second metacognitive skill discussed by these teachers was the ability to self-monitor progress and performance through the use of success criteria (Teacher 6), rubrics (Teacher 2) and "task-oriented feedback" from the teacher (Teacher 2). There was, however, limited evidence of this in the data collected from observed lessons.

Finally, the evidence suggests these teachers spent time developing strategies that would assist their students to become self-regulated learners and provided opportunities and encouragement for students to engage in self-regulated learning. Table 17 illustrates how this was done within the observed lessons.

Table 17. Developing self-regulated learners in observed lessons

<table>
<thead>
<tr>
<th>Teacher behaviour:</th>
<th></th>
</tr>
</thead>
</table>
| Developing skills for self-regulated learning | • Discussing strategies (e.g. help-seeking, study skills, summarising, problem-solving, etc.)  
• Discussing the importance of persistence and being willing to engage in challenging tasks  
• Modelling and scaffolding metacognitive reflection |
| Encouraging self-regulated learning | • Encouraging students to ask questions  
• Responding to student questions  
• Encouraging students to monitor their own understanding  
• Encouraging students to seek help when needed  
• Encouraging the use of available resources and tools to |
check work and monitor progress

- Providing feedback to students in relation to behaviour, skills and understanding
- Giving students responsibility (e.g. accessing resources, choosing partners, behaviour, monitoring own need, choosing where they work)

The analysis of data described in this chapter describes a holistic and student-centred approach to teaching, with the emphasis on supporting students' motivation to learn, their skills for self-regulated learning and their cognitive development within the subjects being taught. Additionally, the responsibility for development was shared not only between student and teacher but also amongst the classroom community.
CHAPTER 5

DISCUSSION AND CONCLUSION
Chapter 5 - Discussion and conclusion

5.1 Introduction

Chapter 4 presented an analysis of data and a conceptual framework was offered to represent the practices and perceptions of teachers who were successful in supporting student growth across all quartiles. This chapter discusses the key elements of this framework within the context of the literature discussed in Chapter 2. The aim is to address the final research question:

RQ3 Why might the perceived contributing factors (RQ1) and related practices (RQ2) lead to growth for top-quartile students?

A discussion of how the behaviour of these teachers might support the growth of their top-quartile students follows. In addition, opportunities to expand this research in further studies will be highlighted.

5.2 Differentiating for academic growth

As discussed in Chapter 1, current policy in Australia advocates that teachers implement differentiation as a means of addressing the learning needs of students whose current level of development might be beyond that of their same age peers. This includes making adjustments to the curriculum that is offered to them as well as methods used for teaching to ensure they are adequately challenged and supported to learn. Research has shown that a lack of awareness of the diverse learning needs of students and a view of student differences as problems or deficits in learning are barriers to effective differentiation (Tomlinson et al., 2003; VanTassel-Baska & Stambaugh, 2005). The responses of teachers in this study indicate an awareness and acceptance of student difference within their classrooms. In terms of high-ability students, these teachers expressed the view that teaching should aim to stretch, extend and challenge them in order to further develop their skills and deepen their understanding of the topics being taught. Such beliefs suggest a motivation to address the needs of high-ability students. The lack of motivation to differentiate for these students, either because it is deemed unnecessary or beyond the responsibility of the teacher, is another identified barrier to differentiation (Rogers, 2007; Tomlinson et al., 2003; VanTassel-Baska & Stambaugh, 2005). Many have cited workload pressures and lack of planning time as impediments to differentiation (Mills et al., 2014; Nicolae, 2014; Rock et al., 2008). In the focus group,
teachers acknowledged the demands of planning for diverse needs but perceived careful planning as key to student success.

5.2.1 Targeting the academic needs of top-quartile students

Differentiation by readiness to learn aligns with a developmental approach to teaching as described by Hutchinson et al. (2014) and Sztajn et al. (2012). The perceptions and behaviours of these teachers suggest a developmental approach to teaching that centred on supporting the growth of all learners by targeting the different levels of development within their classroom. They spoke of the importance of using assessment to drive planning and monitor student progress. The fieldwork provided evidence of a variety of assessment practices that were used for a variety of purposes. The use of assessment to identify students’ readiness levels, plan for targeted intervention and respond to student needs is a key component of differentiation (Tomlinson, 2014), developmental teaching (Hutchinson et al., 2014) and learning trajectory based instruction (Sztajn et al., 2012). Similarly, the literature in relation to high-ability students argues for a continuous and varied approach to assessment that is used to inform grouping, instructional decisions and modifications to ensure that students are adequately challenged (Reis et al., 2008; VanTassel-Baska, 2014). Developmental progressions are seen as useful in assessing student readiness, planning interventions and responding to student needs (Hutchinson et al., 2014; Tomlinson, 2014). Theoretically, a teacher who understands how students develop in relation to a particular skill or concept (by way of a learning progression or trajectory) is better equipped to plan for the needs of students at different levels of ability, with the progression serving as a ‘road map’ for learning (Black, Wilson, & Yao, 2011). In relation to high-ability students, the use of a progression could be used as a tool for assessing mastered content and skills, eliminating content or adjusting the pace of instruction and planning for the next level of development. Wilson et al. (2015) found that using a learning trajectory assisted teachers to extend the learning goals and increase the level of complexity in response to students who exceeded expected levels or advanced at a faster rate than others.

There was some evidence of students working on tasks that targeted different levels of development. In addition, all observed teachers actively monitored students during the lesson through questioning and observations. In response they were able to provide scaffolding, give feedback, answer student questions and repeat instructions when necessary. In relation to top-quartile students, this practice of continuous monitoring, provided the opportunity to assess whether students were being appropriately challenged and intervene when needed. However, it is unclear what role (if any) developmental progressions played in planning and intervention decisions.
Chapter 5: Discussion and conclusion

Inherent in the learning theory that underpins the developmental approach is the need to provide optimal levels of both support and challenge by way of targeting the zone of proximal development (Hutchinson et al., 2014; Sztajn et al., 2012) and providing scaffolding to support learning (Wilson & Devereux, 2014). In addition, this approach implies that curriculum and instruction are differentiated in some way to provide for "multiple zones of proximal development" (Sztajn et al., 2012, p. 151). The teachers involved in this study clearly expressed a belief that targeting tasks and teaching at the ZPD of students was key to their growth. Within observed lessons, there was evidence of a variety of approaches rather than a single common approach. In relation to modifying the curriculum and instruction, there was a clear divide within this group of teachers. Some of the teachers were open and willing to have students working on different tasks during the lesson. These teachers made use of similar ability grouping, targeted instruction within small groups and allocated different tasks to different groups. These practices suggest an attempt was made to compact the curriculum for some students (particularly by those teachers who mentioned the use of pre-testing) and aligns with recommendations made in the literature (Rogers, 2007). In contrast, other teachers chose not to group students based on similar ability, allocated one task for all students and used targeted small group teaching only to address needs emerging within the lesson. There is little evidence that these teachers made use of curriculum compacting, although it is possible that the tasks were open and challenging enough to allow students to work at a developmentally appropriate level. These teachers attempted to provide challenge for top-quartile students by either choosing a rich and challenging task from the start, or by making adjustments within the lesson to increase the level of challenge for some students. This approach potentially aligns with recommendations for the use of open-ended problems that aim to develop higher-order thinking and problem solving skills (Callahan et al., 2015) and multiple ability tasks that are open and intrinsically engaging for all students (Tomlinson & Imbeau, 2010). Likewise, there are potential links to the concept of ‘teaching up’ which involves planning group tasks designed to challenge top students and scaffolding others as needed (Tomlinson & Imbeau, 2010).

The data collected did not allow for any way of determining how well allocated tasks targeted the needs of the students working on them, however, two observations can be made. First, the large amount of time spent in observed lessons on whole class review and instruction - on average, half of the lesson - suggests minimal adjustments have been made to the pace and level of instruction or the amount of review and revision as advocated in the literature (Rogers, 2007). While the use of targeted teacher focus groups provided some opportunity, this was limited. Second, the focus group discussions echoed continuing debates over acceleration and enrichment. There was evidence that students were working at different levels of the mathematics curriculum within the planning documents of two teachers, which
would imply acceleration. Teachers who used frameworks or progressions other than the curriculum to plan for their top-quartile students might be extending the knowledge and skills of their students but not necessarily in ways recognised as acceleration.

In terms of providing opportunities for top-quartile students to achieve academic growth, it can be argued these teachers had the motivation to enable and support that growth due to the developmental approach they took. However, several questions remain to be answered:

- How did these teachers identify students' developmental level or ZPD prior to planning a unit of work? How was it used in planning?
- Were they using any form of developmental framework or continuum to plan for and monitor student progress?
- How well did the instruction and tasks target the needs of top-quartile students?

As Sztajn et al. (2012) point out, instruction based on learning trajectories (LTs) is a relatively new field of research and "despite progress made to empirically develop LTs in various domains, examinations of how teachers come to make sense, adapt, and implement LTs are only beginning to emerge" (p. 148).

5.3 Developing motivation to learn

In addition to responding to the academic needs of students, the model of differentiation presented by Tomlinson and her colleagues advises similar attention be paid to their affective needs (Tomlinson et al., 2003; Tomlinson & Imbeau, 2010; Tomlinson, 2014). Similarly, Appleton et al. (2008) advocate for attending to both the academic challenge provided to students as well as the students’ affective connection to school. Research has shown when addressed in combination the two can lead to “substantial increases in learning” (Appleton et al., 2008, p. 381). The responses of teachers in this study indicate a perception that student engagement is as important to the success of students as providing opportunities for growth. Key to the concept of engagement is an understanding of its links to motivation. Motivation might be seen as providing an impetus to act, while engagement “reflects a person’s active involvement in a task or activity” (Appleton et al., 2008, p. 379). Therefore, attempts to support student motivation are linked with promoting student engagement. Motivation can be influenced by the classroom environment (Urdan & Schoenfelder, 2006). Within this study, student motivation was potentially supported in three ways: establishing a positive classroom climate, needs supportive teaching and sending messages consistent with a mastery goal structure.
5.3.1 Positive classroom climate

The relationship between student engagement, motivation and classroom climate is well documented (Appleton et al., 2008; Matsumura et al., 2008; Patrick et al., 2011; Patrick et al., 2007). Positive classroom climates have been linked with increased participation (Matsumura et al., 2008), effort, pro-social behaviour and engagement (Turner et al., 2013). Establishing a positive learning environment is seen as essential for effective differentiated instruction (Tomlinson & Imbeau, 2010).

Participants perceived the following factors contributed to student growth: high expectations of behaviour and learning, an environment that was safe for risk taking, adequate support for students and teacher knowledge of students. Observations provided evidence of classrooms consistent with descriptions of positive classroom climates from the literature. Viewing these findings within the context of existing research, it is possible that the growth of students within these classrooms was facilitated because the positive climate motivated students to increase their effort and the environment was perceived as safe for taking risks and making mistakes.

5.3.2 Need supportive teaching

Appleton et al. (2008) point to self-determination theory (SDT) as a useful theoretical framework for understanding engagement. In general, classrooms that support the basic needs of relatedness, competence and autonomy have positive effects on intrinsic motivation and self-esteem (Urdan & Shoenfelder, 2006). The research into SDT has predominantly focused on autonomy support, which can be further defined as organisational autonomy, procedural autonomy and cognitive autonomy (see Stefanou et al., 2004 for a discussion of this).

Viewed from the perspective of SDT, the care and interest shown by these teachers, coupled with opportunities to work with others may have supported students' feelings of belonging and need for relatedness. Establishing rules, expectations and access to support could be viewed as supporting students' needs for competence.

In relation to autonomy support, a few observations can be made. First, while the teachers believed it was important to allow students some choice in what they do, it was unclear in the focus group what that choice related to. Stefanou et al. (2004) noted, student choice is generally associated with aspects of non-cognitive autonomy. Within observed lessons, students were given limited choice over what they did (i.e. tasks, materials used, end products) but were allowed some choice over where and with whom they completed set tasks. Second, efforts to support the cognitive autonomy of students were evident in the way teachers sought student input during discussions, pressed students to explain their thinking,
gave students opportunities to decide how to approach assigned tasks, welcomed different ideas, provided open-ended tasks and encouraged debate. While a thorough analysis of observed lessons in relation to autonomy support has not been undertaken, the above suggests the focus of attempts to support the autonomy of students within these classrooms was in the area of cognitive autonomy. Stefanou et al. (2004) argue while non-cognitive autonomy support may engage students' interest in the short term it is likely that supporting the cognitive autonomy of students is key to long term motivation needed for deeper learning and self-regulation. However, Furtak and Kunter (2012) found that students might perceive high levels of cognitive-autonomy as a lack of support, which may negatively affect achievement. Consistent with the concepts of ZPD and scaffolding, it appears care must be taken to find the optimal balance between cognitive autonomy and support.

5.3.3 Communicating a mastery goal structure

Classrooms that emphasise mastery goals have been linked with increased motivational support, greater willingness of students to seek help (Turner et al., 2002), increased use of self-regulated learning strategies, increased intrinsic motivation, increased persistence (Grant & Dweck, 2003), increased effort (Blackwell et al., 2007) and a willingness to take risks and engage with challenging tasks (Elliott & Dweck, 1988). The emphasis on mastery rather than performance sits well with the developmental approach to teaching discussed earlier and the differentiation model.

The responses and behaviours of these teachers indicate beliefs consistent with an incremental view of intelligence and characteristic of a mastery goal orientation. In addition, observed lessons provided evidence that effort, persistence, participation and thinking were emphasised rather than correctness, speed or ability. Such messages align with a mastery goal structure (Patrick et al., 2011). An emphasis on mastery goals is seen as particularly important for high-ability students who may be at risk of developing risk avoidance behaviours that could prevent them from reaching their potential (Dweck, 2012; Esparza et al., 2014).

In the same way that these teachers perceived the importance of targeting students' ZPD, it can be argued they also saw a benefit in attending to their motivational development or what Brophy (1999) termed their "motivational zone of proximal development". The link between cognitive challenge and motivation cannot be discounted. As Blackwell et al. (2007) note, "Motivational beliefs may not have an effect until challenge is present and success is difficult" (p. 258). High-ability students may be used to experiencing academic success with minimal effort, as noted by Masters (2015). As such, they might resist attempts to challenge
them and may benefit from efforts to facilitate not only their cognitive development but also their motivation to engage and persist in situations that demand increased effort (as found by Reis & Boeve, 2009). Any intervention aimed at improving the engagement of high-ability students should therefore aim to increase the level of intrinsic motivation of students (McCoach & Siegle, 2003).

5.4 Developing self-regulated learners

There is clear evidence of the effect of self-regulated learning on academic achievement and motivation to learn (Dignath et al., 2008). It has been identified as a key factor in the underachievement of gifted students (Stoeger & Ziegler, 2005). Recent research has emphasised the dynamic nature of the process of self-regulated learning and its relationship with teacher behaviour (Housand & Reis, 2008; van Beek, de Jong, Minnaert, & Wubbels, 2014). The work of van Beek et al. (2014) supports the idea that all teacher behaviour can be categorised in terms of a single dimension of regulation (as either external/teacher regulation, shared regulation or internal/student regulation). However, they argue this is not an effective way of categorising teachers as, in practice, they often use a combination of these approaches to regulation (van Beek et al., 2014).

The teachers within this study perceived the importance of students' being able to regulate their own learning and viewed this as a skill to be developed rather than an innate trait of individual students. Viewing the behaviour of these teachers through the lens of regulation, it is apparent that across all areas of regulation (cognition, motivation, behaviour and context) there was evidence of external, shared and internal regulation both across classrooms and within individual lessons. Given this was perceived as a key contributing factor in student achievement, an understanding of how regulation was evident in these classrooms may provide an insight into how these teachers attempted to develop students’ self-regulation. In general, these teachers externally regulated the learning by: setting goals for learning, making connections with prior learning, delivering content knowledge, setting tasks, time limits, class procedures, class rules and ability grouping. Evidence of shared regulation can be seen in the frequent use of discussion, modelling of strategies, shared reflection on learning, teacher behaviour during 'roving', encouraging students to ask questions and discussion about the value of persistence, challenge and effort. Understandably, evidence of internal regulation is more difficult to see (particularly as data collected focused on teacher behaviour), however, behaviours that were captured include: student initiated peer support, student initiated discussions during task completion, opportunities to choose strategies for completing set tasks, student questions and student initiated choices about where to work and with whom. If the concept of developing self-regulated learners is thought of in terms of scaffolding, then
van Beek et al.'s (2014) suggestion to examine teachers' use of all three forms of regulation in order to support student development would seem worthy of exploration in future research. Others agree with the approach of scaffolding students' development of self-regulatory skills and point to the additional positive effects on students' engagement and persistence associated with teacher support in this area (Housand & Reis, 2008; Perry, Hutchinson, & Thauberger, 2008).

Many within the field of gifted education have argued for the importance of examining the effect of motivation and self-regulation on student engagement and achievement (Clinkenbeard, 2012; Little, 2012) and support the inclusion of motivational and self-regulatory elements within programs designed for the gifted (for example the Schoolwide Enrichment Model). Perhaps Little (2012) offers the best summary of the interdependent relationship of the various components arguing that while access to challenging activities is essential for these children, it is not enough on its own if they "have not had past learning opportunities sufficiently challenging to promote the development of cognitive strategies and self-regulation practices that will support engagement with challenging tasks" (p. 697).

5.5 Limitations

As is the case with all research, there are limitations to the current study that need to be discussed. This study was built largely on the perceptions of this group of teachers and that impacts on what may and may not be inferred from the data collected. First, these teachers were chosen with the aim of understanding how they might be facilitating the growth of their top-quartile students. As such, any attempt to generalise these findings would not be supported. Second, student achievement is a complex issue involving a multitude of potential factors, the perceptions of these teachers may or may not reflect the factors that contributed to individual student performances. Third, the observations were designed around the factors these teachers identified in the focus group. While attempts were made within the discussion above to link the findings with research, the collection of data was not designed with this in mind. Further research might look to collect data in relation to the various theoretical frameworks in order to continue to develop the conceptual categories presented here. Finally, no attempt was made to gather data in relation to student perceptions or student-to-student interactions, often a key feature of research into motivation, classroom climate and self-regulated learning. While the aim here was to identify teacher behaviours, individual students within the same classroom might perceive those behaviours in different ways. The collecting of qualitative data in the form of field notes inevitably involves some level of observer subjectivity. Care was taken to provide guidelines and training to minimise this,
Chapter 5: Discussion and conclusion

Further effort was made by ensuring two researchers attended each observation and recorded individual field notes. Even so, it is possible that others observing the same lessons might perceive them in different ways, and this may also differ from the perceptions of students and teachers within those classrooms. In addition, the analysis of qualitative data involves its own level of subjective interpretation and therefore the analysis and findings presented here are an interpretation of the data rather than a statement of objective certainty.

Time and resource constraints prevented more than two lessons to be observed for each teacher and this may not have been an adequate amount of time to capture the complexity of teacher practice. It is possible that additional lessons might either support the data collected or provide contradictory or additional evidence that would require adjustments to the proposed framework. Indeed, from a grounded theory perspective, this forms the basis of theoretical sampling.

Finally, the data collected within this study allowed for some forms of analysis but not others. In particular, the lack of audio or video recording and access to lesson transcripts prevented a microanalysis of teacher discourse that might be necessary if looking in detail at practices such as scaffolding. Similarly, the planning documents collected within the field work phase did not provide a clear insight into the way that teachers used (or did not use) assessment data to inform their selection of tasks and pedagogic strategies.

5.5.1 Linking perceptions, planning and practice

Within the focus group discussions, the participating teachers expressed their beliefs about what contributed most to the success of their students. These perceptions represented broad ideas such as targeting student needs and creating a safe environment. It was possible to extract some detail about what these referred to through the discussions. For instance, it was clear that many of these teachers defined student need in terms of their ZPD. Likewise, an environment that was safe was deemed essential for risk-taking. What remained unclear were the specific teaching behaviours that went into targeting student needs, establishing an environment or developing self-regulation of learning.

The planning contained general information about the structure and resources used within a lesson but lacked detail about the thinking and decisions made in the process of planning. While there was some evidence of attempts to plan for targeting students' level of development, it was limited. Likewise, it was difficult to find evidence related to classroom environment, student engagement and self-regulation within the planning documents. Due to the general nature of the documents, there was little evidence of specific teacher behaviours such as scaffolding, monitoring, questioning, etc.
Finally, it can be said that teachers generally followed what was written in their plan. There was also evidence of specific behaviours that could be linked to their perceptions of effective practice. For example, the continuous monitoring and intervention that occurred within lessons was seen as evidence of attempts to target student need. What was missing was the thinking that informed teacher behaviour within lessons and how these decisions were linked to the broad ideas identified in the focus group discussions.

5.6 Implications

While differentiation has both widespread and theoretical support, this support has not translated into the classroom. At its core differentiation requires teachers to hold certain beliefs about teaching and learning, without those any attempts to differentiate will most certainly remain at a surface level of compliance. Perhaps the success of the teachers in this study can be attributed to an alignment with the philosophy behind the differentiation model rather than their commitment or skill in using particular strategies associated with it. Without an understanding of the theoretical underpinnings behind the model, it is possible to view difference in terms of deficits and believe that higher-ability students do not require differentiation (Brighton et al., 2005). In addition, there is a risk of selecting strategies at random rather than basing decisions on careful consideration of the academic and affective needs of individual learners. As argued by others (Dixon, Yssel, McConnell, & Hardin, 2014; Hertberg-Davis, 2009), professional development programs should seek to provide a philosophical basis for differentiation as well as support for managing a differentiated classroom.

The developmental approach to teaching (Hutchinson et al., 2014) and learning trajectory based instruction (Sztajn et al., 2012) offer promising support for teachers attempting to differentiate by readiness to learn. In particular, the use of learning trajectories might provide a useful tool for assessing and responding to diverse student academic needs. Future research is needed to clearly understand how teachers might use these within their practice (Wilson et al., 2015).

The research presented here may offer an alternative that shifts the focus from difference (a key element of differentiation) to development. Key to the developmental approach is the notion of scaffolding within a student's zone of proximal development. Although scaffolding is traditionally confined to discussions of cognitive development, there is potential value in applying the concept to include the development of self-regulation and motivation. Doing so might allow adjustments based on student engagement, readiness levels and autonomy to have a clear and common purpose of supporting the development of learners. The conception of learner development as a holistic goal suggests that the components of regulation,
motivation and cognition be treated together as interrelated and interdependent aspects of development rather than elements that compete against each other for attention.

Future research might work to define the multi-dimensional construct of 'teaching for growth' presented here and look for ways to measure it. Doing so would allow the description of teacher profiles in relation to the construct and the ability to explore the relationship between those profiles and student achievement.

5.7 Conclusion

The above discussion highlights the ways in which the perceptions and practices of these teachers might create classrooms that have a high potential for developing all students, including those within the top-quartile. Their developmental approach to teaching supported the cognitive development of students by attempting to match the level of cognitive demand with the student's level of readiness to learn. Key to this approach is the availability of support and scaffolding. The difficulty of developing students with a diverse range of starting points requires skill and a willingness to allow students to be either working on different tasks or at different levels on the same task. If we accept that students will require support in order to engage meaningfully with tasks that are targeted at their ZPD, two options seem possible. The teacher may assign less challenging tasks to students to complete independently or in unsupervised groups while reserving more challenging tasks for use within small, ability-based teacher focus groups. While it is possible that some teachers within this study might have taken this approach, not all used ability grouping. Another option, and one that appears more consistent with the data collected in this research, would be to support students' ability and willingness to engage in challenging activities in the absence of the teacher, thus sharing the responsibility for growth with the students. Such a collaborative approach to learning is advocated by Tomlinson (2014) and social constructivist models of learning (Vygotsky, 1978). By sharing the responsibility for learning with students, these teachers may have provided students with additional sources of support and the power to access them. It is possible that having opportunities to work with peers served a variety of purposes including motivation for learning, opportunities to engage in self-regulated learning and access to peer support that aided understanding and skill development.

The teachers within this study appeared to recognise the benefit of taking a broader approach to student development. Not only did they aim to provide opportunities for academic growth for individual students, they also perceived the importance of supporting students’ to actively engage in those opportunities. This holistic approach to development appeared to focus on developing students knowledge and skills within academic subjects as well as their motivation and ability to take control over their own learning. As such, efforts were aimed not
only at scaffolding academic development but also cognitive autonomy, intrinsic motivation and self-regulated learning.
Appendix - Observation tool

Observer: _____________  School code: _____  Teacher code: _____  Year level: _____  Subject: Reading comprehension / Numeracy
Date of observation: _____  Duration of lesson: _____ to _____ am / pm

<table>
<thead>
<tr>
<th>Time (coded in 5 min intervals), Please use another sheet if lesson is more than 1 hour</th>
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Teacher behaviours:
Please note observed teacher behaviours using codes listed in REAP Observation Codes

Additional notes:

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Student behaviours:
Please note observed student behaviours using codes listed in REAP Observation Codes
If group work is being conducted, please show each box is one group. Also note which group teacher is working in with a T.
# Observational Behaviour List

## Pedagogical Strategies
- The teacher explains the purpose for learning the content (Pur)
- The teacher discusses the connections with past learning (Conn)
- The teacher models thinking processes (TS_models)
- The teacher asks learners to discuss strategies used to complete tasks (TS_student)
- The teacher provides opportunities for learners to reflect (S-R)
- The teacher provides opportunities for learners to extend their learning (EL)
- The teacher delivers the lesson content (TC_delivers)
- The teacher reviews the lesson content (TC_reviews)
- The teacher encourages discussion of alternative strategies (TS_D)
- The teacher presents strategies (TS_presents)
- The teacher elicits strategies from learners (TS_learners)
- The teacher fosters or initiates discussion to engage thinking (D_thinking)
- The teacher uses a variety of questioning techniques (Q)
- The teacher directs learners to mentor other learners (PT)

## Assessment
- The teacher uses assessment measures to determine learner understanding and progress (A)
- The teacher offers specific feedback on task/learning (F)
- The teacher adjusts instruction based on feedback from learners (M)

## Environment – Classroom Climate
- The teacher invites students to share ideas and ways of thinking (Th)
- The teacher encourages learners to ask for help when encountering difficulties (Help)
- The teacher encourages learners to take risks (RT)
- The teacher explicitly teaches learners listening, sharing and communication skills (SP)
- The teacher encourages learners to take responsibility for their own learning (Res)

## Classroom management
- The teacher directs learners to routines in order to manage the learning environment (Rou)
- The teacher refers to established rules to manage behaviour (Beh)
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