Meeting the Needs of High-Ability Learners in Mathematics

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Today’s elementary mathematics classroom is academically diverse, full of students with different backgrounds and experiences, different learning profiles, and different readiness to learn. In most math classrooms, much attention is given to the needs of struggling students, as teachers are under pressure to raise test scores and help all students meet basic standards. Meanwhile, the needs of the highest-achievers in mathematics are largely ignored. Highly capable students spend much of their time doing the same work as their lower-achieving peers, which arguably holds them back from reaching their academic potential. This practitioner inquiry will explore the following question: How can I provide differentiated learning opportunities for high-ability students that will allow them to explore deep, complex mathematics within their Zone of Proximal Development?

Context for the Project

Meeting the needs of high-ability students in math has been of interest to me since my own children started elementary school. Both of my children picked up on math concepts very quickly, and it seemed that they spent their first six years of school repeating content they already knew, with few opportunities for enrichment or acceleration. When my youngest was in third grade, he was a prolific reader, and would come home from school having read hundreds of pages from his latest novel during the school day. “When did you have time to read so much at school?” I asked him.

“During math,” he replied. I was horrified. “During math? You read fantasy fiction novels during math?” After further questioning both my son and his teacher, I discovered that my son would rush through the assigned math problems so he could do what he really loved, read. This was not an isolated incident, and it troubled me. Since when is assigning the same
work to kids of all ability levels, and giving them free time when they finish, acceptable? And
why is reading an acceptable choice during math? From that point on, I focused my volunteer
hours at the school on providing enriching math opportunities for my sons and their high-
achieving peers.

Years later, when I became a fifth-grade teacher, I brought with me my passion for
challenging the brightest students, intentionally seeking ways to make sure these kids were
engaged and growing as mathematicians. Yet I could not shake the feeling that my good
intentions were not enough. I remember meeting with one set of parents before school one
morning. They shared that their son, who is very bright in math, thrives when he is challenged.
When he isn’t challenged, he becomes withdrawn, and loses interest in school. They expressed
their hope that this would be a good year in math for their son. I responded by sharing some of
the strategies I have used in years past to challenge bright kids, along with my own passion for
inspiring gifted kids. But inside, I was full of anxiety and insecurity. I knew that despite my
best efforts, their son would be bored at times, and was academically capable of more than what
I would ask of him. I needed help in developing a clear, meaningful plan for how to meet the
needs of my brightest students.

Demographic Data

I teach fifth grade in an independent private school serving 250 children in Junior-
Kindergarten through eighth grade. Located in a mountain town of 90,000 in the Pacific
Northwest, the school promises a challenging academic curriculum, preparing each student to
reach their full potential every day. Classes are kept intentionally small (15-22 students), and
each elementary classroom has a well-qualified instructional assistant for core subjects. Most of
the parents are affluent and educated, with high standards for their children’s educational
experience. In this environment, it is an expectation that teachers will provide differentiated learning experiences for students according to their needs.

Yet there is tension around this issue of high-ability learners: tension between teachers and parents, as parents understandably advocate for their high-ability child to be appropriately challenged; tension between teachers, as we individually struggle to find ways to meet the needs of these kids in the context of a heterogeneous class; tension between teachers and administrators, as teachers perceive a lack of support in providing a consistent philosophy for serving high-achieving math students; and sometimes, tension between teachers and high-ability students, as these motivated students really do desire “harder math.”

As a first step in understanding how to meet the needs of high-ability math learners, I engaged in a review of published literature on the subject. The literature review will begin by exploring the justification for differentiating instruction for high-ability learners, followed by an explanation of how Vygotsky’s sociocultural learning theory can provide a theoretical context for meeting the needs of gifted mathematicians. Next, the literature review will summarize research on instructional strategies that benefit high-ability learners, but are also considered best practice for all learners, followed by research that highlights instructional strategies recommended specifically for gifted students. Finally, typical obstacles to meeting the needs of high-ability math learners will be explored, including pragmatic as well as philosophical concerns.

**Review of the Literature**

**Why Differentiation is Necessary**

For the purposes of this paper, a high-ability math student is defined as a child who has demonstrated outstanding performance in mathematics, as evidenced by scores on standardized
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tests, unit pretests, and/or an ability to quickly master mathematical concepts. Studies have shown that 40-50% of typical classroom content is redundant for these students, yet they spend 80% of their time doing the same work as their classmates (Callahan, Moon, Oh, Azano, & Hailey, 2015; Reis et al., 1993). When teachers fail to adequately challenge these high-ability learners, students are at risk for boredom, inattentiveness, underachievement, and discipline issues, as well as underdeveloped persistence and study skills (Reis et al., 1993), since excellent scores can be earned with very little effort or intellectual risk (Tomlinson, 2000).

Differentiation begins by recognizing that students differ from one another in their readiness to learn, interests, and preferred learning styles (Hertberg-Davis, 2009; Tomlinson, 2000). These differences affect the content that students are ready to learn, the pace at which they learn, and the level of support they need (Tomlinson, 2000). The responsive teacher must respond to each student with individualized instruction appropriate to his or her needs, including the high-ability learner.

In order for teachers to effectively differentiate for all learners, students must continuously be assessed and regrouped according to their needs (Callahan et al., 2015; Hertberg-Davis, 2009). All students, regardless of gifted status, should be assessed before each new unit, each new standard, and even each new lesson, ensuring that instruction is modified and adjusted to meet each student’s needs throughout the year. Fluid groupings allow students to move into and out of more challenging options as interest and readiness dictate.

Sociocultural Theory

Effective differentiation for high-ability learners can be further understood through the context of Lev Vygotsky’s sociocultural learning theory, as understanding how children learn is critical to developing effective instructional techniques. According to Vygotsky, students learn
best in community, rather than in isolation. “Vygotsky's theories stress the fundamental role of social interaction in the development of cognition” (McLeod, 2007, para. 2). Vygotsky believed that learning takes place largely as a result of teacher-student and student-student interactions. Students learn best when they are active participants in their learning, verbalizing their current understandings, listening and responding to their classmates’ thinking, and building their cognition as a community of learners (McLeod, 2007). Thus, high-ability students must be given opportunities to interact with their classmates and with their teacher, rather than working independently, as is too often the case for many high-ability learners.

Vygotsky also believed that students learn best when working within their Zone of Proximal Development (ZPD), where the learning tasks are challenging, but doable with support (Tools of the Mind, n.d.). Learning progress is maximized when students are working at the edge of their ability, pushing them to expand the work they can do independently. Conversely, learning remains stagnant when students work on tasks that are too easy, while tasks that are too hard can lead to frustration and discouragement. In order to maximize learning, high-ability students must work together on challenging learning tasks, and given the support needed to be successful. In most cases, this will require the teacher to intentionally plan learning tasks for high-ability students that look different from the rest of the class.

**Strategies That Benefit All Students**

Many studies have explored instructional strategies that increase the growth and achievement of high-ability math learners. Reassuringly, many of the instructional strategies recommended for high-ability students also benefit all students. For example, best practice for teaching gifted students includes using inquiry-based instruction, which invites students to explore concepts through questions, problems and scenarios, rather than simply being presented
with information (Pierce et al., 2011). Best practice for gifted students also includes issue- or problem-based learning, where students learn in the context of relevant, real-world problems (Van Tassel-Baska & Brown, 2007). Not only are these instructional strategies good for high-ability learners, they are also considered foundational for meaningful mathematics instruction, and therefore good for all students.

In addition, gifted students’ achievement is increased when learning activities are matched to student interests, pace, and challenge level (Callahan et al., 2015; Reis, 2007). In other words, gifted students need to be working on different learning tasks than their classmates, but all students should be working on learning tasks matched to their interests, pace and ability. One way teachers can achieve this is by planning tiered lessons. In a tiered lesson, a specific standard, concept or generalization is targeted, but multiple pathways are provided for students to achieve the objective. Studies show that tiered lessons consistently raise the achievement of high-ability students. Wilson (2014) found that teachers who implemented tiered lessons in a heterogeneous classroom saw improvement in all students’ grade-level test scores, though standardized test scores remained constant. Similarly, Pierce et al. (2011) found that when tiered lessons were implemented with fidelity in a heterogeneous classroom, all students, regardless of gifted status, showed learning gains. A similar study looked at the effect of implementing differentiated math curricula with third graders. In this study, gifted students showed significant learning gains when curriculum was differentiated, while low and average students showed slight improvement (McCoach, Gubbins, Foreman, Rambo, & Rubenstein, 2013). In addition, Brighton et al. (2005) found that even modest attempts at differentiation improved the attitudes of all students toward learning, as students responded positively to having choices. So it appears that tiered lessons have the potential to improve all students’ attitudes toward learning, while
significantly improving the achievement of high-ability learners, and having a positive or neutral affect on the achievement of low and average students.

**Differentiation Strategies for Gifted Students**

Next, this literature review will look at instructional strategies that have been shown to specifically meet the academic needs of high-ability students. One common strategy to adjust the pace of learning is acceleration, which can be accomplished by skipping a grade in the early years (Reis, 2007), or having students work on above grade-level mathematics (Van Tassel-Baska & Brown, 2007). However, studies show mixed results for accelerating high-ability students (Gavin, Casa, Adelson, Carroll, & Sheffield, 2009), as simply speeding up the pace does not necessarily yield the critical thinking skills and deep conceptual knowledge today’s standards require, nor does it consider the social and emotional needs of the child.

Another strategy for adjusting the pace for high-ability students is curriculum compacting, where the teacher assesses what content the high-ability student has already mastered, and eliminates time spent on previously mastered content (Reis, 2007). Not yet mastered content is covered in as little time as possible, freeing up time to work on enrichment tasks (Reis et al., 1993). In a study of over 400 elementary students, gifted students who received compacted curriculum and enrichment consistently scored higher on standardized mathematics tests than gifted students who were taught without curriculum compacting (Reis et al., 1993).

Studies on enriched curriculum have yielded mixed results in terms of increased achievement (Gavin et al., 2009), as the quality of enrichment tasks varies. However, research is clear that high-ability students benefit from increased depth in learning tasks (Callahan et al., 2015; Gavin et al., 2009; Hertberg-Davis, 2009). High-ability students should work on tasks that
require them to uncover big ideas, patterns, and unanswered questions in mathematics (Callahan et al., 2015), wrestle with profound ideas, and make sense of and organize important mathematical concepts (Tomlinson, 2000). Learning tasks should encourage students to investigate real problems with open-ended solutions (Callahan et al., 2015), connect curriculum to the wider world, and use what they know in important ways (Tomlinson, 2000). Learning tasks should be concept-based, rather than procedure-based, and encourage students to think and act like practicing mathematicians (Gavin et al., 2009).

In addition to deeper content, high-ability students need access to more complex mathematics (Callahan et al., 2015; Gavin et al., 2009; Hertberg-Davis, 2009). This includes making connections between concepts or strategies, or working on investigations that are more abstract or ambiguous (Callahan et al., 2015). Mathematics for high-ability learners should emphasize higher level thinking skills (Van Tassel-Baska & Brown, 2007), perhaps including critical thinking that goes beyond the student’s grade level (Callahan et al., 2015). High-ability learners also benefit from having independent opportunities to explore content, skills, or investigations that align with their interests (Callahan et al., 2015).

Recognizing that providing access to deep, complex mathematics is an overwhelming task for many classroom teachers, a group of educators devised a research-based curriculum for gifted and talented 3rd-5th graders, called Mentoring Mathematical Minds. This curriculum combines many elements of best practice strategies for gifted young mathematicians: enrichment through interesting and high-level math investigations, accelerated by 1-2 grade levels, with an emphasis on problem solving. Students are encouraged to behave as professional mathematicians, communicating their thinking verbally and in writing. A study on the impact of implementing of Mentoring Mathematical Minds showed consistent and significant increased
student achievement when compared to a control group of gifted students using a standard curriculum (Gavin et al., 2007). However, because the study involved so many variables, it is impossible to isolate the effectiveness of each instructional strategy on student growth, as well as the effect of the strong professional development support provided to teachers in this study.

Finally, clustering is a strategy often recommended for high-ability students (Van Tassel-Baska & Brown, 2007; Reis, 2007). Clustering involves placing 3-10 high-ability students from one grade level together in one classroom, along with heterogeneous classmates. When grouped together, gifted students can work as a team on deeper and more complex math, supported by a teacher committed to differentiating the learning tasks for this group. It is difficult to distinguish whether clustering is effective as a result of bringing a community of gifted learners together, or as a result of the teacher being more intentional about providing differentiated learning experiences for high-ability students. Likely, both are important, especially when considered through the lens of Vygotsky’s sociocultural learning theory: students are learning in a social context, and engaging in deep, complex mathematical learning tasks within their Zone of Proximal Development.

**Obstacles to Differentiation**

Despite the proven benefits of differentiated instruction for high-ability learners, meaningful differentiation is rarely implemented in most classrooms, even with strong professional development support (Brighton, Hertberg, Moon, Tomlinson, & Callahan, 2005). Many qualitative studies have looked at what makes differentiating instruction for high students difficult for teachers. Pragmatically, teachers are under increased pressure to prepare students for standardized tests, thus are hesitant to deviate from the standard curriculum (Brighton et al., 2005; Hertberg-Davis, 2009). However, studies consistently show that abandoning traditional
content in favor of acceleration, curriculum compacting, or problem-based, enriching curriculum, even in heterogeneous classrooms, does not negatively impact student achievement on standardized tests (McCoach et al., 2013; Reis et al., 1993; VanTassel-Baska & Brown, 2007). A second obstacle is that time constraints limit the time available for teachers to prepare differentiated lessons and collaborate with colleagues (Brighton et al., 2005; Hertberg-Davis, 2009; Wilson, 2014). Third, teachers have concerns about classroom management issues when students are simultaneously working on different learning tasks (Brighton et al., 2005; Wilson, 2014).

Philosophically, providing differentiated options for high-ability learners forces teachers to confront deeply held beliefs about effective teaching and learning. Teachers often perceive that differentiation is only important for struggling students, and high-ability students don’t need or want differentiation (Brighton et al., 2005). Some teachers believe it is unfair to expect high-ability students to do more or harder work than their classmates (Brighton et al., 2005). Or when teachers do attempt to provide differentiated instruction without professional development support, they simply provide group work, or fun activities that are not grounded in concept-rich learning, and are unrelated to student readiness to learn (Hertberg-Davis, 2009). Some teachers fear the social-emotional ramifications of calling attention to student differences in their readiness to learn, especially during the tumultuous middle school years (Brighton et al., 2005). Taken together, these reasons demonstrate why differentiating instruction for high-ability learners is rare in today’s classroom.

**Analysis**

Though differentiating instruction to meet the needs of high-ability learners is challenging, it is essential if these students are to reach their academic potential. Gifted students,
like all children, learn best in the context of a supportive community of learners, working on learning tasks within their Zone of Proximal Development. By beginning with instructional strategies that benefit all learners, teachers can begin to implement changes that also better meet the needs of high-ability students. For the mathematics classroom, this means shifting from the traditional method of simply introducing a skill, and having students practice what they have been taught, to teaching through inquiry and problem-based lessons. High-ability students should be given opportunities to build understanding of new concepts through solving interesting problems, exploring different solution pathways, and constructing meaning for algorithms, creating a richer mathematics experience for all learners.

For the high-ability learner, curriculum compacting is a promising option to ensure that gifted kids are working in their ZPD most of the time. However, teachers need training and support in how to provide content-rich alternatives for high-ability learners (Brighton et al., 2005; Hertberg-Davis, 2009; Tomlinson, 2000). A study by Reis et al. (1993) revealed that 95% of teachers were able to identify high-ability learners in their classrooms, and 80% were able to successfully compact curriculum by identifying what standards had not yet been mastered, and assign learning tasks to meet those standards. However, those same teachers did not follow up with appropriately challenging alternative activities for high-ability learners. Rather, students were given choices based on learning preferences or interests, but lacking in deep, complex mathematics (Brighton et al., 2005; Reis et al., 1993). When teachers received meaningful, ongoing professional development on curriculum compacting and how to differentiate for gifted learners, high-ability learners experienced significant learning gains as well as improved attitudes toward learning (Brighton et al., 2005; Reis et al., 1993).
Tiered lessons offer another promising option for meeting the needs of all students, where students are all working on the same concept or standard, but at differing levels of depth and complexity. This instructional strategy has been shown to benefit the achievement of high-ability students (Pierce et al., 2011), without negatively impacting the achievement of low or average students (McCoach, Gubbins, Foreman, Rambo, & Rubenstein, 2013). In addition, offering differentiated choices helps all students to take ownership of their learning, leading to increased motivation and improved attitudes toward school (Brighton et al., 2005). However, the effectiveness of tiered lessons is limited by the quality of the learning tasks provided by the teacher, highlighting again the importance of professional development for teachers.

Many quantitative studies involving heterogeneous classrooms rely on pre- and post-test scores from the Iowa Tests of Basic Skills (Brighton et al., 2005; Callahan et al., 2015; McCoach et al., 2013; Pierce et al., 2011). While these tests are widely perceived to be valid and reliable, they may contribute to a ceiling effect when measuring the growth of high-ability students. High-achieving students often score in the 90th percentile on the pretest, which does not leave much room for growth among this student group. In addition, a standardized test is not necessarily a good measure of deeper mathematical thinking and process skills, which are highly valued in today’s Common Core climate. More research needs to be done to identify appropriate tools to accurately measure the growth and achievement of high students.
Conclusions

In conclusion, knowing and meeting the needs of each individual student in a diverse classroom is a challenging but worthy endeavor, and must include a plan for meeting the needs of the highest students. A mathematics teacher can begin this process by implementing instructional strategies that benefit all learners, such as teaching through inquiry, issues, and problems, rather than through direct instruction. Another promising strategy is to develop tiered lessons, offering a variety of content-rich learning opportunities that match each student’s readiness to learn, interest, pace and ZPD, and allow gifted students to work among a community of learners. Ongoing professional development on how to plan rich, complex, alternative activities for high-ability students is a critical ingredient for implementing meaningful changes that support the academic growth of high-ability math students.

Plan for Action

In order to further explore my self-study research question, “How can I provide differentiated learning opportunities for high-ability students that allow them to explore deep, complex mathematics within their Zone of Proximal Development?,” I propose four actions. First, I will write and interpret autobiographical vignettes to explore why this topic triggers an emotional response from me. According to Ambler (2016), taking the time to write autobiographical vignettes can help teachers engage in self-reflection that enhances professional learning. I am hopeful that reflecting on stories that have contributed to my beliefs and attitudes toward meeting the needs of gifted students in math will help me understand my defensiveness around this issue.

Second, I will research strategies for differentiating math for gifted students. I hope that exploring how other teachers have resolved this issue will help me develop a vision for what
specific strategies I might try with my gifted students. Larrivee (2000) acknowledges that when teachers are courageous enough to abandon an old way of thinking or doing, a period of uncertainty and chaos may follow. Having concrete ideas to try may lessen my fear of abandoning my old system, ultimately leading to a better learning experience for my gifted students.

Third, I will reflect on my actions and beliefs regarding high-ability math learners. What strategies do I believe I am currently using to meet the needs of my brightest students? How do these strategies align with my beliefs about student learning, and with the best practices revealed in the review of the literature? What are the obstacles for me? What support do I need? This action is inspired by Larrivee’s (2000) assertion that it is not enough to simply have a bag of tricks or techniques. I must engage in critical reflection that allows me to examine which teaching practices are good fits with my beliefs, my classroom structure, and my personal style. Perhaps then I can confidently articulate to parents how I intend to meet the needs of their high-ability child.

Finally, I will review one of my previously taught math units. Larrivee (2000) cautions us that we can develop mental habits, biases and presuppositions that tend to close us off from new ways of perceiving, and I recognize in myself a resistance to changing my current classroom structure. After analyzing the differentiation options I have used in the past for mathematical depth and complexity, I hope that I will be more mentally willing to reconsider if there are structures and/or learning tasks that might better meet the needs of my high-ability students.

Following each action, I will write in a reflection journal, recording new insights. I will code all of my data for the following themes: tensions, solutions, and support needed.
Inquiry Cycles

The data that emerged from my inquiry cycles came from multiple sources, beginning with two autobiographical vignettes. As I chose what stories to write about, I followed Bullough and Pinnegar’s (2001) advice to write about “nodal moments,” moments that are significant because they help connect specific stories to a broader theme that brings insight to a common issue. One incident involved me as the parent of a high-ability math learner, and one incident involved me as the teacher interacting with the parents of a high-ability student. As I interpreted each vignette, I reflected on how these incidents have informed my beliefs, values and practices related to high-ability learners in math, then recorded new insights in a self-study reflection journal.

For my second set of data, I researched instructional strategies used with success by other teachers to meet the needs of high-ability math learners. I recorded promising strategies, reflecting on why certain approaches appealed to me, while others were rejected, which helped to reveal my own subjectivity. As before, I wrote in my self-study reflection journal, developing and clarifying my own philosophy about best practices for challenging high-ability students in math, and beginning to formalize a plan for how I will address the needs of high-ability students in my own classroom.

For my third set of data, recognizing that I wanted to be able to articulately and succinctly communicate my philosophy and plan to parents and colleagues, I wrote a belief statement about meeting the needs of high-ability students in math. I clarified the responsibilities of parents, teacher, and student, identified my core beliefs about what quality math instruction looks like, and outlined specific instructional strategies I will use with gifted students to help them grow as mathematicians. I identified personal obstacles to meeting the
needs of high-ability learners, as well as the support I will need to overcome these challenges. Again, I wrote in my reflection journal, recording my self-study process as well as new insights.

For my fourth and final set of data, I evaluated one of my math units, identifying the differentiated learning tasks available to high-ability learners. In my reflection journal, I analyzed how well the existing learning tasks align with what I now know about best practices for challenging bright students, and then strategized solutions to make the tasks more challenging. I found this work especially helpful in addressing the tension between what I want my learning tasks to look like and what they actually look like, as well as helping to clarify what is lacking in my current curriculum.

Each time I began a new action, I reviewed my writing from the previous actions. After all the data had been collected and coded, I organized the notes into three categories: tensions, solutions, and support needed. I knew I had uncovered a big idea when a theme surfaced from multiple sources. This process of extensive writing, re-reading, and writing some more helped me to meaningfully interpret my experiences and research, bring coherence to the different sections of my action plan, and clarify my thinking about how I plan to meet the needs of high-ability students (Gibbs, 2005).

Peshkin (1988) cautions researchers to directly address their own subjectivity, as it will impact the entire research process. Borrowing Peshkin’s advice, I reflected on which pieces of my research triggered emotional responses from me. Based on this reflective work, I created a list of “I’s” that I bring to my teaching role, acknowledging how my own beliefs and experiences influence my thinking about meeting the needs of high-ability learners in math. Because this self-study is personal, I allowed myself to choose or reject instructional strategies based on alignment with my values and beliefs. However, I also uncovered biases that negatively affect
my interactions with parents, leading to unproductive tension. When I encountered my own defensiveness, I sought to reframe my thinking and work toward productive solutions.

After analyzing my data, I realized that my tension around meeting the needs of high-ability learners comes from two sources: 1) unmet parent expectations, and 2) lack of knowledge and confidence. My autobiographical vignettes revealed that as a parent, I understand the frustration of watching a bright child remain unchallenged. My reflection journal reads:

I have been the mom who was disappointed that there was not a clear, meaningful plan for how to meet the needs of the brightest kids. I have been the mom that is frustrated because her kids are doing the exact same work as everyone else, finishing in record time, and then either helping other kids (which is fine on occasion) or having free choice time. But even as I advocated for my own kids, I felt uncomfortable questioning the teacher’s plan. I, after all, was not a trained elementary teacher at the time, and was ignorant of best practices for challenging high-ability kids. I only knew that my kids were capable of doing much, much more than was being asked of them.

This shows that I sympathize with the concerns of parents, agreeing that high-ability students have unique needs, and that these needs are often ignored in today’s classroom. Yet I don’t know exactly how to meet these students’ needs, and therefore feel inadequate and exposed.

I also realized that part of the teacher/parent tension comes from a difference in philosophy about what quality math instruction and learning looks like. My reflection journal states, “Sometimes the tension comes from a disconnect between what I value about math learning and what parents value.” Writing the belief statement helped me clarify what I know about best practices in math, so I can communicate these values to parents, who may think that meeting their child’s needs means simply accelerating them to the next grade level in math:

Beliefs about the goals of quality math instruction:

- Explore math concepts in depth, focusing on conceptual understanding as well as procedural fluency
- Build deep understanding by making connections: between strategies, between mathematical concepts, and with real-world applications
• Develop effective mathematical communication skills—explain one’s thinking verbally and in writing, understand the thinking of others, and explore mathematical concepts within a community of learners.

Putting my thoughts and beliefs in writing built my confidence, and revealed two more biases: 1) I believe that my professionalism and experience as a teacher deserve respect from parents, and 2) I am not in support of acceleration. Acceleration creates pragmatic challenges for the teacher in the grade level above, and does not emphasize deep, conceptual understanding. I need to acknowledge this difference in values, and help parents to understand the beliefs that inform my decisions about high-quality math instruction for their child.

However, like most teachers, I still feel a tension between what I know is best for high-ability learners and what is actually happening in my classroom. This became painfully obvious to me as I analyzed my own math unit, and was unimpressed with the quality of learning tasks I have been providing. Having a clear philosophy is a great starting point, but implementing that philosophy in a meaningful way is difficult. Too often, the pace is too slow, and the learning tasks too easy to inspire and challenge the brightest students. This was my experience as I parented my own children through elementary school, and it has been the experience of several parents of my own students who have approached me with concerns, despite my best efforts to challenge bright kids.

As I explored solutions for challenging gifted students in math, there were two recurring themes. First, a classroom climate that fosters exploration, curiosity, academic risk, and autonomy is essential. The data from my research into what other teachers are doing revealed success in classrooms that are “flexible and supportive”, “relaxed yet challenging,” “encourage responsibility and autonomy,” and “encourage risk-taking and exploration.” Since high-ability learners often value perfection and speed, they perceive failure when they struggle to understand
a concept or solve a problem. Creating a supportive classroom culture that welcomes risks, mistakes, and perseverance will help to address this common challenge for high-ability students.

Second, echoing the literature review, my data revealed that gifted students are well served by working on problem-based, open-ended math tasks that encourage multiple pathways and/or solutions, mathematical discourse, and higher-level thinking skills (Callahan, Moon, Oh, Azano, & Hailey, 2015; Pierce et al., 2011; Van Tassel-Baska & Brown, 2007). As I wrote in my reflection journal, “Kids need time to explore concepts, look for connections, invent strategies, and share their new understandings with one another.” Other teachers have made problems more complex by using harder numbers, asking gifted students to find patterns or make generalizations, and providing problems that are inquiry-based and open-ended, with multiple solution pathways.

Finally, analyzing my coded data for support needed revealed that, while I have a much clearer understanding of what high quality learning tasks should look like for my gifted students, I need time and help to find or create these tasks. Repeatedly, I wrote about wanting to offer higher quality tasks for gifted learners: “I am most motivated to begin by addressing the quality of the learning tasks, followed by figuring out ways to hold students accountable to their learning,” and “I would like to find more options using technology to help students explore mathematical concepts.” In my unit analysis, I wrote about wanting to provide more cross-curricular options, and exploratory questions. However, I need help in knowing how to access rich learning tasks.

In order to create a classroom climate that supports autonomy, I need support from my colleagues and from experts, as well as feedback from the students themselves. Several of my colleagues have effectively created a climate of supportive independence when teaching literacy,
and I suspect that many of their strategies can be adapted to teaching math. As reflected in my journal:

I do want to work on teaching students how to choose appropriate activities, and enforcing different choices if needed. I want to have a more positive, nurturing attitude toward this, with less irritation if a child needs more guidance in choosing their partner, place and/or activity. I also want to help guide high-ability students toward each other, so they can engage in high-level discourse about the mathematics, and inspire one another.

I am encouraged to find that my classroom already has a strong foundation for meeting the needs of high-ability learners, but I have work to do in providing accountability, as well as access to high quality math tasks.

**Final Reflection**

Through this practitioner inquiry, I have learned much about myself as an educator. When I began this process, I felt intimidated by dissatisfied parents, anxious about not meeting parent and student expectations, and insecure about my knowledge as a teacher. As a result of this self-study, I was able to reframe my thinking about parents advocating for their child’s needs, welcoming parents as partners in supporting their child’s growth in math. I now hope to be proactive with parents of high-ability kids, assuring them that I am aware of their child’s needs, and sharing my beliefs about quality math instruction, as well as strategies for challenging their child.

I am also accepting that I am a work in progress, and will never have all the answers. This is a truth to embrace, rather than something to hide. Reflecting on my experiences, beliefs and values during this self-study has helped me to see that I am human, with ever-evolving thoughts, knowledge and feelings that make me who I am as an educator. Rather than pretending to have all the answers, I can be transparent, working together with parents and students toward a common goal: an inspiring, challenging experience in fifth-grade math.
Even though I don’t have all the answers, I do have a growing professional knowledge about the best practices for teaching math to high-ability students, which has greatly increased my confidence in devising a meaningful plan to meet the needs of the brightest kids. I now envision my math block starting with an inquiry-based “Team Challenge,” when all students will work in heterogeneous teams to solve a challenging problem. This will give high-ability students access to problem-based, open-ended math, teach students to be flexible, creative thinkers, and require students to articulate their thinking to others. Allowing gifted students to work within a community of learners nurtures their social-emotional needs, helps them make mathematical connections that they might have otherwise missed, and helps them realize that there are many pathways to a solution. Each math class will also include time for “Workshop,” when students will choose from differentiated learning tasks within their ZPD. I want to provide a variety of high-level thinking tasks for gifted learners, encouraging students to explore mathematical concepts, persevere with complex problems, and let their mathematical curiosity guide them to interesting questions, discoveries, and connections. These instructional strategies align with my now-clearly defined beliefs about high-quality math instruction, my teaching style, and the structure of my classroom.

Clearly, I still have work to do to implement my new plan for high-ability learners. I need to find or create worthwhile learning tasks for each unit, put systems in place, and be open to adjustments based on feedback from students and parents. However, I now have the tools I need to transform the learning experience for all students in my classroom. This process has taught me the power of paying attention when I feel tension in my teaching role, examining the source of the tension, and implementing a thoughtful action plan to explore solutions. Teaching is a life-long process of reflection and growth. There are still many areas for improvement in my
classroom, but I can choose to address them one at a time through this reflective process of practitioner inquiry.
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