“They sit selfishly.” Beginning STEM Educators’ Expectations of Young Adolescent Students

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Abstract

To meet the demand for certified math and science teachers, alternative certification programs attempt to provide fast-track training and licensure of STEM-area educators (Goldhaber, Kreig, Theobald, & Brown, 2014). Teachers prepared in programs with a middle level specialization have been shown to participate in effective practices such as teaming and collaborative instructional strategies (Mertens, Flowers, & Mulhall, 2002). However, few preparation programs have middle level specializations, and teachers prepared in accelerated programs tend to have greater difficulties with classroom management, planning, and differentiated instruction than those prepared in traditional programs (Darling-Hammond, 2009; Wilson, 2011).

Researchers examined a cohort of beginning teachers completing an accelerated STEM M.A.T. program whose struggles with planning and engaging young adolescents seemed outside of the norm. Utilizing the middle school model (NMSA, 2010; Jackson & Davis, 2000), Lortie’s (1975) apprenticeship of observation, and the formation of teaching beliefs (Richardson, 2003) as an integrated framework, this study sought to describe and explain the beliefs of beginning STEM teachers prepared in an accelerated M.A.T. program. Findings indicate new teachers from STEM backgrounds view their students through the lenses of their previous educational experiences and highlight the need for traditional teacher preparation and specialized middle level instruction.

Keywords: teacher preparation, alternative certification, teacher beliefs

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Introduction

The shortage of educators in the STEM fields has helped alternative certification programs, like accelerated MAT programs, rise in popularity (Kelly & Northrup, 2015). These programs attempt to meet the demand for new teachers by providing similar standards and methods as traditional teacher preparation programs, but they are structured to provide accelerated induction into the profession through shorter completion timelines, reduced credit requirements, and less rigorous admission standards (Darling-Hammond, 2009). Often, these programs are created to recruit content-area specialists to the profession (Cooperman, 2000; Tigchelaar et al., 2010), particularly in critical needs areas such as the STEM fields. Teachers prepared in these programs tend to have greater instructional difficulties than beginning teachers prepared in traditional education programs (Darling-Hammond, 2009; Wilson, 2011). Further, beginning mathematics and science teachers leave teaching at significantly higher rates than other new teachers (Ingersoll et al., 2014).

Teacher beliefs and expectations about students can play an influential role in how they perceive the information presented in their education preparation program and influence the instructional decisions they make (Richardson, 2003). Many educational researchers conclude that teacher preparation programs must provide systematic opportunities for reflection that are embedded in methods coursework and field experiences (Darling-Hammond & Bransford, 2005). Addressing beliefs and expectations through reflection helps make tacit and unexamined beliefs explicit so they can be explored, examined, and even challenged (Darling-Hammond & Bransford, 2005). Furthermore, a deep understanding of adolescent development is needed for teachers to deliver developmentally responsive instruction of young adolescents (McEwin & Dickinson, 2012). Good and associates (2006) called for further research to examine how appropriate expectations may buffer beginning teachers from the difficulties of teaching. Examining the beliefs and expectations of beginning STEM educators prepared in alternative programs may inform preparation programs to better prepare STEM educators of young adolescents.

Few studies have examined STEM teachers’ expectations and beliefs about young adolescent students (Ingersoll et al., 2014; Tigchelaar et al., 2010; Good et al., 2006). This exploratory study examines the struggles of first-year STEM educators prepared in an accelerated MAT program. Researchers became interested in this cohort after university supervisors became alarmed at the new teachers’ heightened emotional responses to typical teaching situations. One aspect of this study examined how the new teachers’ expectations of students contributed to their struggles. The question guiding this research is as follows: What expectations do beginning middle level STEM educators enrolled in an accelerated MAT program have for young adolescent students? The purpose of this study is to describe the expectations that teachers in an accelerated alternative certification program held regarding young adolescents. Knowing these expectations may help guide teacher educators in the design and delivery of pedagogical content and alternative preparation programs.

Literature Review

Adolescent Development and Middle Level Teacher Preparation

Middle level education focuses on early adolescence (10- to 15-year-olds) as a distinct period of human growth and development. During this time, children experience more rapid and meaningful change than at any other point in their lives. Young adolescents experience physical, cognitive, moral, psychological, and social-emotional growth within this short window of development. While these changes will affect most young adolescents, the importance of each individual change will vary widely based on the individual student. Furthermore, these characteristics may combine with other factors such as ethnicity, race, gender, socioeconomic status, and learning and physical disabilities to provide a distinct period of development that warrants educators who have the knowledge and understanding to provide developmentally appropriate instruction (Howell, Cook, & Faulkner, 2013; Jackson & Davis, 2000; National Middle School Association, 2010).

Education programs are charged with preparing new teachers with not only content and pedagogy, but also with an understanding of the students they will teach (Darling-Hammond & Bransford, 2005; National Council for Accreditation of Teacher Education [NCATE], 2010). An understanding of adolescent development helps teachers provide developmentally responsive pedagogy and curriculum through choosing materials, instructional strategies, and learning experiences that meet young adolescents where they are as students, help them develop as learners, and help build teacher-student relationships (Darling-Hammond & Bransford, 2005). Emotionally supportive environments are a necessity for young adolescent learning, and thus, it is important for teachers to create those types of environments in their classrooms (NCATE, 2010). Understanding young adolescents is crucial not only to provide effective instruction, but to attend to their social...
and emotional needs that are necessary components for academic achievement (NCATE, 2010). It is important for teachers to adopt a developmental perspective through which they see the importance of supporting students in all the various areas of development, not just the cognitive area (NCATE, 2010). Additionally, students tend to perform better in school when they have a strong grasp of social-emotional competencies, while those who struggle may be more prone to academic, social, and emotional difficulties (Eisenberg, 2006; Guerra & Bradshaw, 2008).

Among the tenets of middle level philosophy is understanding young adolescent development, which includes a strong emphasis on emotional and social development (NMSA, 2010). Therefore, educators who “understand these young people and the cultural context in which they grow to maturity will make informed decisions about the kinds of schools and learning experiences that young adolescents need” (NMSA, 2010, p. 9). Effective middle level educators “are collaborators who know how to form learning partnerships with their students, demonstrating empathy while engaging them in significant academic learning experiences” (NMSA, 2010, p. 15). AMLE suggests education for young adolescents should be “developmentally responsive using the distinctive nature of young adolescents as the foundation upon which all decisions about school organization, policies, curriculum, instruction, and assessment are made” (NMSA, 2010). Transitioning from an elementary school, young adolescents in a middle level school are met with impersonalized school environments, more departmentalization, and increased expectations for behavior and school work. These issues are compounded with the differences in development of cognitive and social skills for young adolescents and can negatively impact academic performance (Wigfield et al., 2015).

Teachers who possess a thorough understanding of child development and learning are more likely to provide learning experiences that support students’ developmental needs and be effective in the classroom (Comer, Haynes, Joyner, & Ben-Avie, 1996; Darling-Hammond & Bransford, 2005). Middle grades teachers who have had specialized middle level teacher preparation were found to be more likely to implement developmentally appropriate practices in their classrooms (Mertens et al., 2002).

It is important to have educators who understand young adolescents and the contexts in which they mature so they can make developmentally responsive instructional decisions. Educators must have knowledge of this distinct period of development, know how to respond to students’ developmental needs, and engage students in meaningful relevant learning. As such, the education of young adolescents requires teachers who have been specially trained to teach this unique group (NMSA, 2010). Despite the need for specialization, fewer than 50% of states require middle level certification to teach in the middle grades (Gaskill, 2002; McEwin, Dickinson, & Smith, 2003). Where mandates for specific middle level preparation do exist, they often end with grade eight, so 14- and 15-year-old students in grade nine are often served in high schools with secondary teachers who may not be prepared to work with young adolescents. The transition to high school and the freshman year is still a critical developmental period for young adolescents that requires developmentally responsive support and instruction.

**Formation of Teacher Beliefs**

Educators develop their beliefs about teaching and learning primarily from their professional and personal experiences (Lortie, 1975; Richardson, 1996; Risko et al., 2008). In particular, they form beliefs from formal knowledge gained through formal training, such as teacher preparation programs, and from personal experiences, including experiences both in and out of school (Richardson, 1996).

Unlike people entering many other professions, pre-service teachers commence their training programs with 12 to 14 years of exposure to the field as students in school. During this “apprenticeship of observation” (Lortie, 1975), education students develop strong conceptions of teaching and learning from years of exposure to teaching as students before they enter an education program (Lortie, 1975; Pajares, 1992; Richardson, 2003). Beliefs resulting from experiences with school and instruction may have the most impact on the formation of beliefs about teaching and learning (Richardson, 1996). In fact, these beliefs may influence whether or not pre-service teachers accept information presented to them in their coursework (Mewborn & Tyminski, 2006; Oleson & Hora, 2014), and may also influence their classroom instructional decisions (Thompson, Windschitl, & Braaten, 2013). However, Lortie’s original work and most subsequent research on the apprenticeship of observation have focused on the experiences of teachers during their K–12 schooling, but not their university coursework years (Grossman, 1991; Mewborn & Tyminski, 2006; Ng, Nicholas, & Williams, 2010).

Smagorinsky and Barnes (2014) found a teaching program’s structure, focus, and process may determine
how one’s apprenticeship of observation as a college student may affect teacher candidates’ conceptions of teaching. They suggested instructors should guide pre-service teachers to reflect on their experiences as students to inform their instructional decision making. Flores and Day (2006) argued that a beginning teacher’s past experiences serves as a “frame of reference” (p. 224) through which experiences combine with context to help form their new teacher identity. This suggests the following:

Teacher recruitment, pre-service preparation, in-service professional development, and teacher retention may be chronologically sequenced but, epistemologically, they are intertwined and continually loop back and forth to influence each other in mutually constitutive ways. (Olsen, 2008, pp. 23–24)

Therefore, teacher educators should actively engage pre-service candidates in examining and challenging their beliefs about teaching. As Rinke, Mawhinney, and Park (2014) asserted, “Understanding the early educational biographies of pre-service teachers offers considerable detail with respect to their decisions to teach, their ideas about teaching and learning, and their future career plans” (p. 93).

Smagorinsky and Barnes (2014) suggested teacher educators reexamine the apprenticeship of observation they provide pre-service teachers, and create specific reflective activities and experiences that may contribute to the reconstruction of their schooling experiences. These reflective activities would help pre-service candidates process and act upon new experiences in deliberate ways rather than serving as a template for action as characterized in much writing about the apprenticeship of observation.

While teacher preparation programs provide a foundation for new teachers’ content and pedagogical knowledge, new teachers’ “beliefs about their subject area and its teaching are also shaped by their experiences as students” (Ozgun-Koca & Sen, 2006, p. 947). However, the preparation phase may not adequately address beliefs about students. Pre-service teachers enter programs with well-established beliefs that are resistant to change (Richardson, 2003). These strongly held beliefs can affect how pre-service teachers receive information presented to them in their programs (Mewborn & Tyminski, 2006) and the instructional decisions they make in their classrooms (Richardson, 2003). Therefore, it is important for teacher preparation programs to deliberately and intentionally address beliefs during university coursework (Gainsburg, 2012).

Figure 1 depicts the interrelationship among factors that shape middle level STEM teacher beliefs.

**Methodology**

**Study Context**

The participants in this study were students at a large urban university in the Southeast who had enrolled in a grant-funded accelerated MAT program designed to prepare students with backgrounds in science, technology, engineering, and mathematics (STEM) fields to teach in secondary classrooms. After they were accepted into the program, the participants, termed “scholars” by faculty and staff, completed all coursework of a traditional two-year, eight-semester MAT teacher preparation program in an accelerated timeframe of four consecutive semesters (see Appendix A). This program included coursework in content-specific methods, classroom management, and adolescent development. Each participant completed field experiences of 64 hours their first semester and 100 hours in the second semester.

The participants procured teaching positions in middle and high schools of varying socioeconomic status. Each participant completed a paid internship as the teacher of record during the final semester. In most traditional internships, teacher candidates begin their placement in a cooperating teacher’s classroom and gradually take over responsibilities as the semester progresses. In this program, the teachers worked in paid internships as full-time teachers of record without the assistance of cooperating teachers, but each had a school-site mentor that the placement school assigned as well as a university supervisor. This study was conducted at the end of their paid internship after they had taken all of their coursework.

These teachers each received a scholarship that covered tuition, books, and other expenses during the preparation period. A provision of the scholarship required the participants to agree to teach for at least two of the following four years in an approved district, or the award money must be paid back.
Participants
The researchers observed and interviewed a cohort of seven secondary math and science teachers during their first semester in the classroom. This article focuses on a subset of five of these teachers who taught in middle grades (5–9) classrooms in both middle school and high school settings (see Table 1). All participants were full-time teachers of record at middle or high schools in high-needs districts. These schools are in adjacent counties and varied in size, demographics, and the socioeconomic status of their students.

Design and Data Collection
The researchers used Stake’s (2006) qualitative multiple case study method, which is particularly useful when the researchers intend to gain a deeper understanding of a common characteristic or condition across a number of individual cases. After obtaining IRB approval, the researchers collected data during the participants’ winter break, which marked the end of their first semester of teaching, the end of their paid internships, and the completion of their MAT degrees. This time was ideal as participants were preparing for the spring semester, and the fall semester was still fresh on their minds.

The researchers interviewed participants individually with a guided semi-structured interview protocol (see Appendix B) that used broad questions to allow participants to tell their stories (Olson, 2011). Questions included, “Thinking back to the beginning of the school year, can you tell me about your expectations about teaching coming into this experience?” and “Reflecting on those initial expectations, can you tell us about how those expectations were or were not met as you began teaching?” Two researchers conducted the interviews: the main interviewer who asked questions from the protocol and follow-up questions, and a secondary interviewer who took notes and asked probing questions. Interviews averaged approximately 45 minutes in length. Participants were aware that their university supervisors were part of the research team, but the university supervisors did not interview their teachers. University supervisors’ field notes, observation logs, and evaluations were additional sources of data that the researchers used to triangulate.

Data Analysis
The researchers conducted a total of 14 interviews, including seven individual interviews with the teachers and seven individual interviews with their university supervisors. Semi-structured interview protocols guided all interviews. Interviews were audio recorded and completely transcribed, and totaled 153 pages of single-spaced pages of transcript. Transcripts were sent to participants for member checks, but they recommended no modifications. Additionally, archival data (e.g., university supervisor notes, e-mails, and evaluations) were collected to aid in the triangulation of the data.

All researchers first read the transcripts holistically to gain familiarity with the data, then all members of the research team memoed and coded one randomly chosen transcript. Memoing recorded the group’s conversation with the data (Saldaña, 2012). After they collectively read and memoed the random transcript, the research team agreed on a code list. Each researcher memoed and coded one additional transcript. Once all transcripts were coded, the research team collectively reviewed and agreed on coding for all transcripts. The team used constant comparison to compare the responses of the participants to examine similarities and differences. The researchers also used open coding (i.e., the process of applying terms or concepts or small bits of data) throughout data analysis (Corbin & Strauss, 2008).

The researchers employed a process of collaborative coding so they could examine the data through a number of perspectives, corroborate evidence from different sources and viewpoints, reduce the chances for misinterpretations, clarify meaning through multiple perceptions, provide opportunities for triangulation, and establish inter-rater reliability (Stake, 2006). They thoroughly discussed different perspectives and additional data (e.g., supervisor field notes, observation logs, and evaluations) to help ensure the validity and reliability of the coding process. The researchers initially identified 253 codes for the larger research study, and then they narrowed these codes to 15 subcategories during a second cycle of coding. They created these subcategories from codes that had relationships with each other. Three overarching categories (i.e., expectations of student motivation, expectations of student academic achievement, and expectations of student behavior) are discussed in this article (see Table 2).

Findings
The analysis yielded three overarching categories: expectations of student motivation, expectations of student academic achievement, and expectations of student behavior.

Expectations of Student Motivation
The category “student motivation” included codes relating to participants’ beliefs and expectations about
| Name (Pseudonym) | Age | Subject area | School type | Undergraduate degree | School site demographics White | Black Hispanic Other | Percent free or reduced lunch | Additional duties |
|------------------|-----|--------------|-------------|----------------------|-------------------------------|---------------------|-----------------------------|------------------|
| Augusta          | 24  | Math         | High school | Mathematics          | 52                            | 13                  | 25                          | 10               | 47.8  | Was asked to serve as basketball coach and provided lunch tutoring |
| Amy              | 23  | Science      | Middle school | Biology             | 5.76                         | 68.6                | 21.3                        | 4.34             | 95.1  | Mandatory attendance in district trainings; was working at a failing school |
| Cynthia          | 26  | Math         | High school | Mathematics          | 31.4                          | 35.9                | 26.3                        | 6.4              | 76.8  |                                                                                  |
| Diane            | 25  | Science      | Middle school | Biology             | 59.6                          | 10.4                | 15.9                        | 14.1             | 73.4  |                                                                                  |
| Lori             | 23  | Science      | High school | Biology              | 32.7                          | 30.6                | 25                          | 11.7             | 50.4  | Ran school’s Science Fair and Biotech club                                      |
student motivation. The participants thought their young adolescent students would be self-motivated to learn, and they tended to use their own experiences as students as evidence, generalizing their personal experiences to all their current students.

Participants expected students to be self-motivated. Lori stated, “They just want the answers, they just want the answer to how to get an A on the test. They don’t see it as an investment, as far as education is concerned. So that was the biggest eye-opener.” She expressed frustration at this low motivation, stating, “I just assumed a lot of these kids would take on what they felt their strengths were and run with it, but a lot of them are literally just bodies in the classroom.” Augusta addressed the engagement of her incoming ninth graders: “I started off with all these ideas and it just flopped. The kids weren’t interested. They were disengaged. You have little Johnny over there sword fighting.”

Cynthia expected her middle grades students to be as motivated as she was when she was a student their age. She stated, “I think that I expected it to be a lot more like my own personal high school experience . . . because I was in the higher level classes, that there was a lot more student responsibility and motivation to learn.” Diane expected students to be engaged because she herself was engaged and interested in the content, but she stated, “The reality was that I had a classroom full of 10 to 11 year olds, hyper kids who have never been to middle school before.”

As the participants ended their first semester of teaching, they began to realize they could possibly play an active role in fostering drive in students who

| Sample of initial codes                                                                 | Collapsed codes                                                                 | Category                                           |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------|
| Lack of student prior science knowledge                                                | • Expectations of student performance | Expectations of Student Academic Performance       |
| Academic expectations of “regular” students                                          | • Expectations of student academic behavior                                   |                                                   |
| Academic behaviors of “regular” students                                              | • Expectations of student knowledge                                          |                                                   |
| Academic behaviors of “honors” students                                               | • Expectations of student academic placement                                  |                                                   |
| Expectations of prior math knowledge                                                  |                                                                                  |                                                   |
| Not “honors” students                                                                 |                                                                                  |                                                   |
| Connects with honors students more than “regular” students                            |                                                                                  |                                                   |
| Participant motivated by challenges in school                                          | • Difficulty motivating students                                               | Expectations of Student Motivation                 |
| Participant motivated by grades                                                       | • Personal experiences with motivation                                          |                                                   |
| Students don’t see value in education                                                 |                                                                                  |                                                   |
| Students are not motivated to do work                                                 |                                                                                  |                                                   |
| Expectations of middle grades students                                                |                                                                                  |                                                   |
| Learned helplessness                                                                  |                                                                                  |                                                   |
| Participant prior school experiences                                                  |                                                                                  |                                                   |
| Did not expect student level of behaviors                                             | • Expected students to behave like adults                                     | Expectations of Student Behavior                   |
| Expected students to behave like college students                                     | • Expected students to behave like practicum experiences                       |                                                   |
| Thought treating students like adults would help behaviors                            | • Did not expect the level of classroom management issues that arose            |                                                   |
| Did not expect to have to teach them everything (e.g., procedures, rules)              |                                                                                  |                                                   |
| Difficulty creating CM with school rules different                                    |                                                                                  |                                                   |
| Did not see this behavior in practicum                                                |                                                                                  |                                                   |
| Not sure how to address CM issues                                                    |                                                                                  |                                                   |

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were not self-motivated. Amy lamented, “They just get so bored, so I don’t know how to make it interesting and relevant to them to get them to really participate.” Lori stated that she started creating “assignments worth their time, making assignments worthwhile.” Seeing the overall relationship of the students within the greater school setting, she continued, “You also have to think what else are they doing in every other class, or six other classes, too; and if I’m different, then maybe that will make them pay attention or be engaged more.” Cynthia also found that her approach was not working and changed course by having most of the work done in class and limiting how much homework she gave.

The interns who were able to separate their motivational locus from that of their students began to get past their frustrations and designed instruction to meet the needs of their classes. Amy summed this situation up stating, “It just took time for me to realize what it was that made [it] meaningful to them.” Most did not express that these conditions may have been the same that also guided their own earlier school experiences. Cynthia explained her mismatched expectations. She felt that people who go into teaching have A-type personalities and are motivated to learn and always turn in assignments on time. With regards to students, though, she said, “Some of them are going to be different; it’s still hard to understand them and see where they’re coming from, and it’s just . . . a surprise.”

The participants tended to think their students would be more self-motivated to learn, especially honors students, even when they faced a subject they found difficult or boring. They used their own experiences as high school and college students as evidence, generalizing their personal past experiences to all their current middle grades students.

**Expectations of Student Academic Performance**

Student academic performance was another area that seemed confusing to the cohort. They held some preconceived notions about the placement of students into various levels of their content, how students at those levels should perform, and with what kinds of knowledge students should enter their classrooms.

Based on their own successful academic backgrounds, they may have entered teaching expecting students to perform in accordance with their own recollections of student performance, particularly the honors students, with whom they most closely identified. Augusta stated, “I came in expecting them to behave like the honors students that I remembered, and for one class that was true.” Lori further described how she had a clear affinity for honors students, relating, “My heart is these gifted, lovely gifted kids.”

Their definitions of honors classes did not always match the reality they experienced, and they seemed baffled by the placement of certain students in their honors classes, particularly those teaching incoming ninth graders. Lori described some students as not really belonging in honors classes. “You see kids that are put there because their parents need them or want them there, or [they] are there because, you know, they got one point above the minimum that they need or were at the minimum.” Augusta also questioned how students came to be placed in honors and felt that many were placed there because their parents signed them up rather than being academically qualified.

The honors students stood in stark contrast to the “regular” students in the participants’ minds. Cynthia stated the students in her formal geometry class “are a lot lower level, and so for those classes I had a lot more classroom management concerns . . . it’s very difficult.” For her, the most challenging students in the regular classes were those who were “in lower level classes” and were “too smart and are stuck there.” Lori’s expectations for the academic performance of her regular students were demonstrated as she realized they performed better on a district exam than she thought they could. “Honestly, because I would have never expected that out of that group because they are so rambunctious.”

The cohort members also held definite expectations about the prior content knowledge that their students would bring to their classes. Diane felt overwhelmed when she determined what her students knew in the midst of a lesson, stating, “If the state were to come in and ask my students you know, what are you learning in here, I’m not sure at time that my students would be able to answer that question.” Augusta attempted to lean on her scant knowledge of adolescent development, expecting all of her incoming ninth graders to come in ready to learn algebra easily as they “should be in a formal operative state.” However, she discovered “maybe like five of them are there. The rest of them are in that lower state.” She expected their cognitive development to follow the absolutes about which she had studied and was surprised when it did not. “I had to figure out, you know, how I present things to the kids in a way they can understand. . . . It was going over their heads. They weren’t understanding the math behind it.”
Amy was surprised by the lack of skills that she assumed were prerequisite to students entering eighth grade science. She stated, “They are following along. The thing is, they can’t read and write. Like they genuinely can’t read and write at the eighth grade level and are way below where they need to be.”

Most telling, however, was Augusta’s belief that the beginning of ninth grade definitively separated her students from eighth graders, and that certain teaching strategies ended and began with school structures. She said, “Most of my classes focus on middle school skills like going towards middle school. I’m like that’s great, but I know I never want to teach at a middle school.” She lamented, “So I know a lot of middle school strategies but not much high school strategies.” She did not see the beginning of ninth grade as a continuation of a developmental stage conducive to middle level teaching and academic performance.

The participants did not agree with the placements of many of the students in advanced level courses, as they saw those students as not academically or behaviorally ready for those classes, and they sometimes relied on their own experiences as honors students to measure these placements. Further, they had a skewed understanding of what to expect of students’ academic performances and how to enhance their achievement.

**Expectations of Student Behavior**

The teachers seemed unprepared for some aspects of student behavior that were developmentally appropriate for young adolescents. Despite having spent some practicum time in classrooms and having taken coursework in both classroom management and adolescent development, they had unrealistic expectations about student behavior. Further, the interns had expectations of behavior management that were also largely unmet.

Typical adolescent behavior puzzled them: Augusta called it “bizarre” and “craziness,” while Amy pointed out “every day they were different.” Despite having observed middle grades classrooms during their teacher preparation, some participants became overwhelmed once confronted with the full responsibility of managing student behavior. Amy stated, “In the beginning I think I was actually very scared of my kids. I was so nervous about them. I had a lot of anxiety. You know, Sunday nights and in the mornings, I would just have this terrible anxiety.”

Lori related that her class had “major discipline problems. I mean, I have a class that is the absolute worst I think I’ve ever been in as a student myself; and even in my practicum I didn’t see that.” Augusta agreed and described having to stop teaching due to behavior. She said, “It wasn’t just like five individuals. It was the majority of the class and I lost control.” Amy also expressed management issues: “It’s just like, you know, crazy things, kids snorting salt when we did a lab experiment. Like ‘What are you doing?’ (laughs) Like I don’t know how to handle them sometimes.”

Curiously, the teachers did not expect the difference in behavior between their middle level students and their college classmates. They entered into their teaching positions assuming middle level students, especially honors students, would exhibit a similar level of attention and enthusiasm that math and science majors displayed in the university setting. Diane may have revealed a lack of understanding of adolescent development when she stated, “I wasn’t anticipating all these kids. Like, we go to class and it’s like a class of adults; it’s not like a bunch of energy balls that don’t mind back talking.” Diane further highlighted the discrepancy between the university classroom and her sixth grade class, adding, “So we sit respectfully, and they sit selfishly. Kids are very self-centered, and I wasn’t expecting that. It was a shock for me even though I have gone and observed other classrooms.” Augusta agreed, noting the failure of her adult-like talks and class meetings aimed at curbing behavior problems. She wanted to treat students like “mature individuals” but felt they “couldn’t handle that.” Instead, she resorted to referrals and detentions, which she felt they understood better.

The participants expected their students would exhibit the behaviors observed in their most recent student experience at the university level, and believed they would be capable of being treated like and responding as adults.

Through the course of the interviews, some of the interns expressed they realized the need to approach their students as adolescents and not expect them to behave as their college and math and science peers. Augusta noted a need to have observed more adolescent behavior before she started teaching to be more familiar with it, stating they should have been required “instead of observing a teacher, go out and observe the kids and their behavior and see how the adolescents behave.” Lori gained a sense of the many demands of teaching adolescents, stating, I just think the biggest thing I’ve gained overall is a new appreciation for the career, for the actual job
of a teacher is, or an instructor is. Because it’s not just teaching. It’s everything. It’s everything! From trying to counsel a kid through certain things, or trying to figure out what’s wrong, to knowing when a kid’s sick.

Cynthia added, “I think I just forgot for a little while what it was to be like a teenager. You think you remember, but then when you’re back there, then you really remember, because you’ve like, personally, I’ve matured.” This statement reflects the teacher’s realization that her students were not radically different than she was in her youth; she was the one who had changed.

Some teachers sought alternative explanations for the perceived misbehavior of their students. Amy framed her understanding based on a difference in culture between herself and the student population at her school site. She explained that “culture is very, very different than any schooling that I went through, and the culture of the school is very different.”

Augusta wondered to what extent the misbehavior of honors math students was caused by their misplacement in courses for which they did not have the requisite formal operations thinking.

Assuming their primary job was to deliver content, the beginning teachers did not recognize their responsibility for managing behavior until later in the semester. Augusta stated, “I teach math sometimes. It’s more you have to have a great classroom management background.” Diane felt that parents should be the enforcers of discipline, but conceded she must play a role as well. She stated, “It’s not my job to teach necessarily the behavior, that’s the parents’ job, but I realize the parents are not in the lives of a lot of my students and so I am starting to talk more with parents.”

Augusta grappled with the weight of the task of managing misbehavior in a different way. She shared the following:

I feel so bad because I’m like it’s my responsibility to make sure it’s not that way, but there are just so many of them, so many off task behaviors, what can I really do? Like can I really write everybody a referral? Is that the answer?”

Amy described some lessons she had learned about managing the behaviors of young adolescents:

You have to teach them everything, like a procedure for everything. And sometimes the biggest thing they have to learn is how to be polite and nice to each other, not calling each other names and being harsh with each other and cursing and goofing off and moving around the room hitting each other. It’s constant, continuous reinforcing. You have to be so consistent and catch everything every time.

On one hand, the participants expressed expectations for behaviors of middle grades students that were incongruous with actual behavior, particularly for honors students. On the other hand, they expressed a lack of expectations when they described classroom management that did not meet the needs of young adolescents. This was particularly true of the interns teaching incoming ninth graders at the high school level.

Thus, the participants had incongruous expectations about the motivation of middle level students, particularly honors students. They also felt students did not meet their expectations for academic performance, either due to inappropriate placement or inadequate knowledge. Finally, participants apparently did not expect students to act like kids at the middle level, describing them as “balls of energy” who could not be spoken to as adults.

Discussion

Findings suggest these beginning teachers used their apprenticeship of observation from their university courses to develop expectations for middle grades teaching, and did not have a strong understanding of young adolescent development and behavior. They seemed to view their students through the lenses of their own experiences as students. In particular, findings show these beginning STEM teachers in an accelerated MAT program tended to draw upon their experiences as honors students in secondary school, as well as their science and math undergraduate courses, as a perceived norm for their young adolescent students of diverse populations and varied learning levels. This was reflected in their expressed beliefs about young adolescents’ motivation, academic achievement, and behavior.

Viewing the apprenticeship of observation through the perspective of the formation of teacher beliefs affords opportunities for teacher educators to effectively address the experiences and pedagogy of pre-service teachers. Consistent with the current framework and research, these beginning teachers formed beliefs about how students will behave and act, and how teachers should behave and act based on their own experiences in higher-level classes, such as international baccalaureate (IB)
and honors. They did not expect the types of behaviors and attitudes exhibited by their students, nor did they have an understanding of developmentally responsive instruction. These beginning teachers also expected young adolescents to behave and learn in the manner of their own classmates and instructors they observed during their six-plus years in college. These findings suggest that the pedagogy teachers experience in their university content area and teacher education courses may influence their beliefs about students, and this influence may be more relevant than the influence of their own K–12 student experiences. It also reinforces the need to address preconceptions, beliefs, and expectations in teacher preparation programs. Further, it suggests the need for university instructors/professors in both content area and teacher education departments to model best teaching practices.

It seems most members of the cohort did not have a sufficient working knowledge of child development and middle level instruction going into their placements. This was displayed by their inability to adequately understand the motivational, academic, and behavioral needs of young adolescents, and their role to provide developmentally responsive instruction that addressed adolescents’ needs. The participants also expected their students to be more self-motivated, usually explaining this expectation through the perception of their own sense of intrinsic motivation and passion for the subject they taught. In a sense, they expected their students to be more like their memories of themselves and their classmates during their own adolescence and university experience.

Fast-track alternative certification may not have provided these teachers sufficient background knowledge in the emotional, psychological, and academic development of young adolescents. Though the participants received coursework in management and development, they had no coursework on specialized middle level instruction. Limited field experiences also could have contributed to this difficult adjustment, as well as truncated time in the program to absorb and make meaning of their experiences. More time devoted to these areas may have lessened the teachers’ shock at the perceived atypical behaviors of their students. In the time since their own secondary school years, they had either forgotten or never fully perceived how students learn and behave at that age.

It was evident the teachers did not have high expectations of students placed in lower-level classes. They expressed disappointment in the performance of non-honors students, usually framed by statements of expecting poor outcomes of those not in gifted and advanced classes. Subsequently, these lower expectations were often reinforced by what they felt to be substandard academic performance and behavior exhibited by these “unmotivated” students. In this sense, the teachers failed to recognize that much of young adolescents’ misbehavior is a symptom of their frustration due to academic struggles. Participants also expected honors students to perform at higher levels and to be more self-motivated than typical for their current developmental stage. This often led to expressions of frustration about honors students mistakenly placed in those courses.

Notably, these teachers had few concerns regarding their own content area knowledge, entering their preparation program as scientists and mathematicians. However, teaching is a social science, not a natural science; and the social science of education is quite different from the hard sciences, with the unpredictable variables of adolescent behavior added to the equation. Particular attention should be paid to teacher preparation programs that seek to induct math and science teachers who have been previously trained in a traditional positivist university setting. As alternative teacher preparation programs and alternative certification routes become more prevalent, colleges and school districts must be aware of the unique frustrations and challenges faced by this group of teachers who may more quickly drop out of the profession.

Implications

While this discussion is limited to five teacher interns who were interviewed once mid-year, this study highlights the importance of preparing STEM practitioners for the unique development of young adolescents. As demonstrated in the interviews, teachers with unrealistic expectations for young adolescents will often struggle to meet the academic, motivational, and behavioral needs of middle grades students. Schools must acknowledge that these teachers are content area experts and may not be child development experts. STEM practitioners teaching young adolescents need extra support with the daily business of teaching, (i.e., classroom management, planning, non-instructional duties, etc.) as well as specific training in early adolescent development, particularly student-centered, motivational aspects.

More research must be conducted about the preparation of alternatively-prepared STEM educators (specifically...
research focused on student outcomes like academic achievement, motivation, and behavior) to create environments that are developmentally responsive to the unique needs of adolescents (NMSA, 2010). The cases considered in this study suggest that more than a year may be needed to adequately prepare a teacher for the complexities of teaching. Discussions with prospective students during the admissions process regarding the applicants’ expectations may bring many of these issues to the forefront of the pre-service teacher’s frame of mind during the preparation period. STEM practitioners may need additional training in early adolescent development, particularly student-centered, motivational aspects. Additionally, teacher preparation programs must provide sufficient field experiences and significant exposure to child development theory to adequately overcome beliefs preservice teachers form through apprenticeships of observation, particularly beliefs formed recently at the college level. A more formal induction and development model, such as a school-site mentor-supervised internship, might make the transition to full-time teaching more successful for novice teachers. Finally, ensuring that preservice teachers’ beliefs are grounded in a thorough understanding of the unique behaviors, motivational needs, and academic performance of young adolescents will better prepare these beginning teachers to immediately and more successfully assume their new teaching roles.

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Appendix A

MAT Program Course Sequence

| Fall (semester 1)                          | Spring (semester 2)                          | Summer (semester 3)                          | Fall (semester 4) |
|-------------------------------------------|---------------------------------------------|---------------------------------------------|-----------------|
| Teaching the Adolescent Learner           | Foundations of Measurement                  | Classroom management                         | Paid internship |
| Math/Science Methods                      | Reading in the content area                 | ESOL education for the content areas        |                 |
| Middle school math/science methods        | High school math/science methods            | Teaching Geometry or science                 |                 |
| Teaching data analysis or Biology         | Teaching algebra or Physical and Earth Science |              |                 |
| Practicum (middle school)                 | Practicum (high school)                     | Teaching data analysis or Biology            |                 |

Appendix B

Interview Protocol

Beginning teachers often talk about their expectations of teaching, before they go into teaching, and then the reality that they experience once they get into the full time teaching as a beginning teacher. Thinking back to the beginning of the school year, can you talk a little about what your expectations were coming into the experience? Was there anything you were confident about? Anything you were apprehensive about coming into teaching? Thinking back to the beginning of the school year can you tell me about your expectations about teaching coming into the experience? How would you say those expectations were or were not met?

How did you address your concerns regarding the unpredictability of the students and what they are going to do and how things actually occurred?

Is there anything you are going to work on specifically thinking of next semester?

Is there anything else about your experiences this semester that you want to share with us?

If there is something else that could be added to your education from (the university) what would you want it to be?